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American Journal of Public Health
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Volume 24 August, 1934 Number 8

Effect of a Confidential Inquiry on the Recorded Mortality from Syphilis and Alcoholism*

A Survey in the Westchester County Health District

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AND MARJORIE T. BELLOWS

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AT a meeting of the Vital Statistics Section of the American Public Health Association in 1932, during a general discussion of the possibility of introducing a confidential form of death certificate in this country, the Westchester County Health District was suggested as a test area in which to try out some such system of reporting deaths. It was apparent that before any system could be introduced, a number of factors needed to be given careful consideration. In the first place, it was essential to determine the attitude of the medical profession toward such a project, not only whether it would coöperate but also if in this country it is reasonable to expect a physician to state the exact and complete cause of death on any official record if a part of the record reflects on the character of the deceased. In addition to this, it was necessary to obtain some fairly accurate estimate of the extent to which certain diseases are underreported, in order to ascertain whether or not the present system of reporting causes of death is inaccurate enough to justify the effort and time involved in setting up a system of confidential reporting.

With these purposes in view it was decided to attempt a rapid survey in the Westchester County Health District to determine the extent to which alcoholism and syphilis had been underreported as causes of death during a 2 year period. These two causes were chosen, in spite of the fact that the number of deaths attributed to them is not a large proportion of the total mortality, because they are ones in which there is probably a significant amount of underreporting. The death certificates which had been filed with the County Department of Health during the 2 years from July 1, 1931, through June 30,

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

1933, were arranged and listed according to the name of the physician who signed them. The name, age, sex, date of death, and the primary and contributory causes of death which had been stated on the original death certificate were listed for each patient. Dr. William A. Holla, a physician and member of the staff of the County Health Department, who has long been a practising physician in the county, and who knows well the attitudes and problems of his professional confrères, visited each physician with the list of his deaths and asked him to state for each case—first, whether to his knowledge alcoholism or syphilis had been existent conditions at the time of death, and second, in the event that either condition had existed, whether, in the physician's opinion, it was a primary or contributing cause of death.

Alcoholism was defined for the purpose of the study as the habitual use of excessive amounts of alcoholic beverages. In order to assure the physician that no attempt was being made to use the data in such a way as to reveal his identity or that of his patients, the names of the decedents and the dates of death were detached and left with him. The sheet retained by the investigator and used in the following analysis shows only age, sex, originally assigned causes of death, and the newly acquired information.

Before beginning the survey, the proposed plan was outlined in detail to the Comitia Minora of the County Medical Society. This group not only heartily endorsed the project but volunteered to coöperate in every possible way. The president of the society sent a copy of a letter from the County Health Commissioner, which described the procedure to be followed, to every member of the Medical Society with his own letter of endorsement. As a result, the physicians showed the greatest coöperation and were extremely generous in giving time not only to furnish the desired information but to discuss the whole problem of confidential reporting and its advisability. Some of the local village and city medical societies coöperated by giving an opportunity at their meetings for an open discussion of the project. The results of the survey must, therefore, be considered as a coöperative effort on the part of the medical profession of Westchester County, especially the County Medical Society, and the County Health Department to obtain the most nearly accurate data possible.

The completed survey includes an investigation of 5,299 deaths. The certificates were signed by 365 physicians, each of whom was interviewed with the intention of finding out his reaction to the survey, whether or not he considers a confidential certificate practicable, and what system of reporting would be most satisfactory to him. These physicians comprise a representative professional group. The area in which they practise includes a population of 307,000 distributed in one city of 41,000 population, 5 villages over 10,000 population, 13 villages with from 2,500 to 10,000 population, and 17 rural townships. They included 3 physicians who reported the deaths which occurred in the county hospital, Grasslands, and the county medical examiner. The number of deaths occurring in their practices during the 2 years varied from 1 to 59 with the exception of the hospital physicians and the medical examiner, each of whom signed several hundred certificates.

One hundred and twenty-five of the group of 361 physicians who had deaths recorded among their private patients gave additional confidential information, when interviewed, which was not included on the official death certificate. Of these, 104 had not recorded either syphilis or alcoholism on any of their original certificates.

Although the physicians who gave additional data constituted only about one-third of the total number interviewed, they were those with the largest practices, and the certificates of death which they signed represented about two-thirds of the entire number recorded in private medical practice.

Practically all of the physicians agreed that it would be extremely valuable to devise a system of reporting whereby the exact cause of death could be stated without offense or detriment to the decedent, his family, and the attending physician. In most cases the reason for not stating all essential information relating to the cause of death seems to be that the certificate, before it finally reaches the record files of the State Department of Health, comes under the scrutiny of a local undertaker, a local registrar, his assistants, and other officials who may have access to such records. It is not unreasonable to suppose nor has experience failed to indicate that some of these persons have the human failings of curiosity and gossip. The fact that a death certificate is of access on legal order and that life insurance companies may demand a copy of the record for their purposes does not seem to be nearly so important a factor in promoting incorrect reporting as the element of local interest in fellow citizens.

It was the consensus of the medical profession that physicians would feel far freer to state the true cause of death if this information were sent directly to a central statistical office and did not go through the hands of local residents. Only 6 physicians, or 1.6 per cent, indicated that they disapprove of a confidential certificate, one of these giving as his reason that the present death certificate was adequate and not subject to any great amount of error if other physicians stated the cause or causes of death as accurately as he did. Several refused to discuss the project, or felt that no system could be devised which would assure them that the data were confidential and would legally remain so under pressure of demands for information from sources which might have a legitimate interest in a specific case. The remainder expressed a definite desire to use a different system of reporting and all have shown an interest in the tentative results of the present survey, some suggesting even that other causes of death, such as cancer and tuberculosis, might have been included in this study to make it of maximum value.

The 5,299 deaths investigated fall automatically into 5 classifications with respect to authority for certification. The largest group, 3,583, were deaths of patients of private physicians practising in the County Health District; 821 were deaths which occurred in the large county hospital, Grasslands; 621 were signed by the county medical examiner and for this group no additional information could be obtained; 228 were patients in a cancer hospital, Rosary Hill Home, where the certificates were all signed by one physician, in practically all cases the cause of death being cancer. This institution does not include in its records any extensive history of alcoholism and syphilis. Forty-six deaths occurred in Sing Sing Prison, the cause of death in all but 9 being legal electrocution. In the analysis of the effect of confidential reporting on the death rate, these 5 groups must be considered together. Throughout the study, however, the totals have been broken up into the component groups since the data so arranged give convincing evidence to substantiate the opinion that a large error is introduced solely by the physician's professional conviction that his first duty, even in matters involving official record, is to his patient.

Table I shows the actual increase in the number of deaths assigned to

TABLE I–a
DEATHS IN WHICH SYPHILIS* WAS PRIMARY† CAUSE

Reporting Agency	On Original Certificates	Increase Through Survey	Per cent Increase
All agencies	40	39	97.5
Private Physician	25	28	112.0
Grasslands Hospital	14	11	78.6
Other‡	1	–	–

TABLE I–b
DEATHS IN WHICH ALCOHOLISM** WAS PRIMARY† CAUSE

Reporting Agency	On Original Certificates	Increase Through Survey	Per cent Increase
All agencies	28	16	57.1
Private Physician	3	16	533.3
Grasslands Hospital	12	–	–
Other‡	13	–	–

*Includes syphilis, tabes dorsalis and general paralysis of the insane
† Classified as primary under rules of Manual of Joint Causes
‡ Includes medical examiner, cancer hospital, and Sing Sing Prison, from whom no additional information was obtained
** Includes alcoholism and alcoholic cirrhosis of the liver

syphilis and alcoholism together with the percentage change which is also the percentage increase in the death rate. In arriving at these figures the most conservative method of assigning the cause of death was adopted. Only those cases in which the physician stated that syphilis or alcoholism was a primary or contributing cause of death were considered. These were coded according to the *Manual of Joint Causes of Death*, assuming that the original statements of the physicians would have been recorded together with the additional information.

The number of deaths in the group in which syphilis, including tabes dorsalis and general paralysis of the insane, was a primary cause, increased from 40 to 79, a change of 97.5 per cent in the recorded death rate. Alcoholism or alcoholic cirrhosis of the liver was the original primary cause in 28 cases and the returns of the survey increased the figure to 44 or 57.1 per cent. It will be noted that the increase in the number of deaths from syphilis was considerably greater among physicians' private patients than among hospital patients, the only other group showing any change, and that all of the increase in deaths from alcoholism occurred among the former group. The number of males, among physicians' private patients, who died from syphilis increased from 17 to 33 (94 per cent) and the number of females from 8 to 20 (150 per cent).

The number of deaths from alcoholism and syphilis regularly reported from the hospital is proportionately much higher than in the rest of the county, and in the survey the number of cases in which additional information was obtained was considerably lower. The hospital has a very efficient pathologic service, performing autopsies on over 66 per cent of the deaths, and does not intentionally omit any facts regarding the cause of death on the certificate. The physicians there reviewed all of their cases for the purpose of the study although they felt certain that all essential data had been included on the death certificate. This procedure revealed, however, that syphilis had been omitted in 11 cases where, if it had been stated it would be assigned according to the *Manual of Joint Causes of Death* as the primary cause. In 3 instances the only cause given was aortic insufficiency or thoracic aneurysm, the im-

plication of syphilis being so obvious in the mind of the physician that he assumed no further specification of syphilis as the cause was necessary. In the remaining 8 cases, other causes had been given and syphilis omitted even though it had been a definitely contributing factor, the omission being due largely to a tendency to take from the hospital record the final condition resulting in death. These details are of value in showing the error which enters into certification in cases other than those involving personal relationships.

TABLE II–a

DEATHS IN WHICH SYPHILIS* WAS A PRIMARY OR CONTRIBUTING CAUSE

Reporting Agency	On Survey	On Original Certificate	Per cent Reported on Original Certificate
All agencies	81	40	49.4
Private Physician	55	25	45.5
Grasslands Hospital	25	14	56.0
Others‡	1	1	100.0

TABLE II–b

DEATHS IN WHICH ALCOHOLISM** WAS A PRIMARY OR CONTRIBUTING CAUSE

Reporting Agency	On Survey	On Original Certificate	Per cent Reported on Original Certificate
All agencies	138	45	32.6
Private Physician	95	6	6.3
Grasslands Hospital	26	22	84.6
Others‡	17	17	100.0

* Includes syphilis, tabes dorsalis and general paralysis of insane

‡ Includes medical examiner, cancer hospital and Sing Sing Prison, from whom no additional information was received

** Includes alcoholism and alcoholic cirrhosis of the liver

While the increase in the death rate measures the net statistical change resulting when additional data are secured, it does not show, especially in the case of alcoholism, the extent to which information is omitted from the death certificate. Table II shows for each disease the number of cases in which, according to the physician's statement, the cause should have appeared on the certificate and the number in which it was so certified originally. Syphilis as a primary or contributing cause was stated in 49.4 per cent of the cases in which it should have been, and alcoholism in 32.6 per cent. The amount of understatement among physicians' private patients (45.5 per cent of syphilis deaths and only 6.3 per cent of those from alcoholism were so classified on the original certificate) is a very significant element in determining the total figures.

It is of some interest to note the causes of death assigned by the physician in cases where these contributing factors were omitted. Table III shows the primary cause of death originally assigned in such instances. While certain of the leading causes of mortality (chronic nephritis, myocarditis, cerebral hemorrhage, and lobar pneumonia) were stated frequently, the numbers are so small that there would be no significant change in their death rates, even if all of the deaths were assigned to syphilis or alcoholism. The only causes (other than alcoholism and syphilis themselves) which were were essentially changed by the facts obtained in the survey are non-alcoholic cirrhosis of the liver and aneurysm. Out of 30 deaths originally attributed to non-alcoholic cirrhosis of the liver, 10 in the physicians' opinion were due to chronic alcoholism and should have been as-

TABLE III

PRIMARY CAUSE OF DEATH STATED ON ORIGINAL CERTIFICATE IN CASES WHERE ALCOHOLISM OR SYPHILIS SHOULD HAVE BEEN INCLUDED

Primary Cause of Death On Original Certificate	Cases in Which Alcoholism Should Have Been Included on Certificate*	Cases in Which Syphilis Should Have Been Included on Certificate*	Cases in Which Primary Cause Was Changed through Survey to Syphilis or Alcoholism	All Cases Surveyed
All causes	93	41	55	5,299
Diseases of the heart	21	11	11	1,136
Acute and chronic nephritis	17	5	7	485
Cerebral hemorrhage, cerebral embolism and thrombosis	10	4	4	362
Cirrhosis of the liver (not specified as alcoholic)	10	3	13	30
Pneumonia, all forms	9	2	2	394
Cancer	5	2	..	764
Pulmonary tuberculosis	4	1	1	252
Aneurysm	..	4	4	9
Other diseases of the circulatory system	4	2	5	152
Diabetes	3	..	..	118
Congenital debility, malformations, prematurity and other diseases of early infancy	..	3	3	210
Influenza	2	..	..	43
All other causes†	8	4	5	1,344

* As either primary or secondary cause
† No specific cause appeared on more than one of the certificates on which syphilis or alcoholism should have been included in the statement of cause of death

signed to alcoholic cirrhosis of the liver, and 3 were due to syphilis. Out of 9 deaths in the entire group attributed by the original statements to aneurysm, 4 should have been assigned to syphilis.

The method followed in questioning the physicians has made available data which shows the incidence of alcoholism and syphilis among deaths. Table IV gives the percentages of deaths in which each of these conditions existed for the 5 groups of patients. For the entire group, 1 in 30 males (3.3 per cent) and 1 in 49 females (2.0 per cent) were stated to have had syphilis at the time of death; 1 in 14 males (7.3 per cent) and 1 in 72 females (1.4 per cent) were stated to have been alcoholics.

TABLE IV–a

NUMBERS AND PERCENTAGES OF DECEDENTS WHO WERE STATED TO HAVE HAD SYPHILIS AT THE TIME OF DEATH

	Total Number of Deaths Investigated		Number of Decedents Who Had Syphilis		Percentage of Syphilitics Among Persons Who Died	
	Males	Females	Males	Females	Males	Females
Total	2,790	2,509	93	51	3.3	2.0
Physicians' private patients	1,675	1,908	55	37	3.3	1.9
General hospital patients	497	324	27	14	5.4	4.3
Medical examiner's cases	445	176	1	–	0.2	–
Cancer hospital patients	127	101	–	–	–	–
Prisoners—Sing Sing Prison	46	–	10	–	21.7	–

TABLE IV–b

NUMBERS AND PERCENTAGES OF DECEDENTS WHO WERE STATED TO HAVE BEEN ALCOHOLICS AT THE TIME OF DEATH

	Total Number of Deaths Investigated		Number of Decedents Who Were Alcoholics		Percentage of Alcoholics Among Persons Who Died	
	Males	Females	Males	Females	Males	Females
Total	2,790	2,509	203	35	7.3	1.4
Physicians' private patients	1,675	1,907	162	27	9.7	1.4
General hospital patients	497	324	26	6	5.2	1.9
Medical examiner's cases	445	176	15	2	3.4	1.1
Cancer hospital patients	127	101	–	–	–	–
Prisoners—Sing Sing Prison	46	–	–	–	–	–

SUMMARY

1. The great majority of the 365 physicians reporting deaths in the Westchester County Health District during a 2 year period feel that confidential reporting would result in far greater accuracy in the statement of causes of death than does the present official system.

2. Additional data secured confidentially by personal visit for 5,299 deaths resulted in a death rate from syphilis which is approximately double the recorded mortality and a corrected figure for alcoholism which is 57 per cent higher than the recorded rate.

3. Aneurysm and non-alcoholic cirrhosis of the liver were the only causes of death, other than syphilis and alcoholism, whose death rates were significantly changed by the survey data. The rates for these two causes were each reduced by somewhat more than 40 per cent.

4. Syphilis was stated on the original death certificate as a primary or contributory cause of death in approximately 49 per cent of cases in which it should have been so certified, and alcoholism in 33 per cent.

ACKNOWLEDGMENTS

We wish to express to the Westchester County Medical Society and to the individual practising physicians of the County our appreciation of the coöperation and aid which they have given and on which the entire success of the survey depended. This project was undertaken with the approval of the Council of the Vital Statistics Section of the American Public Health Association and to them we owe thanks for their advice and discussion.

Canadian Public Health Association

PUBLIC Health workers from all parts of the Dominion of Canada met in Montreal during the week of June 11 to attend the Annual Meeting of the Canadian Public Health Association, under the presidency of Dr. Alphonse Lessard, Director of the Quebec Provincial Bureau of Health. The total registration numbered nearly 400 members and guests.

As the Canadian Tuberculosis Association, with Dr. J. A. Couillard as President, was holding its annual meeting at the same time, the programs of the deliberations of the two organizations were arranged to permit several joint sessions.

The presence of Dr. Haven Emerson, President of the American Public Health Association, and of Dr. John A. Ferrell of the Rockefeller Foundation contributed to make the meeting one of the most successful held in recent years.

A feature of the entertainment program was a dinner tendered by the Province of Quebec and the City of Montreal at which the Hon. A. David, Provincial Secretary, whose ministry includes the Bureau of Health, recounted the recent rapid progress effected in the public health of the Province of Quebec, and Dr. Haven Emerson conveyed to the Canadian Associations the greetings of the American Public Health Association.

The Canadian Tuberculosis Association reëlected Dr. J. A. Couillard for President, for the ensuing year. The new President of the Canadian Public Health Association is Dr. F. W. Jackson, of Winnipeg. Dr. Alphonse Lessard, retiring President, was elected an Honorary President of the Association.

A Study of Granite Cutting and Granite Cutters in the Vicinity of New York City

ADELAIDE ROSS SMITH, M.D., F.A.P.H.A.

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THIS was a study of 125 men employed in stone yards in and about Greater New York undertaken to determine the extent to which silicosis is present among them. Since the total number of granite cutters in the state is estimated at about 2,000 this represents approximately 6 per cent. This industry in general presents a serious silicosis risk * but, so far, disappointingly little progress has been made in its control. It was thought that any additional evidence of the need for such control which such a study might furnish would be of value in stimulating preventive action. Examination of the men was supplemented with comprehensive dust counts in two representative yards.

The study was a coöperative undertaking on the part of the Division of Industrial Hygiene of the New York State Labor Department, the New York Tuberculosis and Health Association, and the Industrial Health Department of the Metropolitan Life Insurance Company, together with a group of stone yard employers and the local branch of the Granite Cutters International Association. Dr. J. Burns Amberson of the Tuberculosis Service, Bellevue Hospital, read the X-ray films.

GENERAL DESCRIPTION OF THE INDUSTRY

Stone cutting in and about New York City is carried on in some 200 plants, most of them small, employing on an average less than a dozen men each. In normal times work is steady and the men are busy throughout the year. The work is done partially in the open, the sheds as a rule being open on at least one side. Conditions of work thus differ from those in some other states where, on account of more severe winter weather, work is carried on for the most part in enclosed sheds. This difference has been considered by not a few employers about New York City a basis for the belief that stone cutting in this vicinity is less harmful than it is known to be in New England.

All of the men examined worked with granite which because of its durability has to a large extent replaced softer stones such as marble, limestone, and brown stone, for monumental and building purposes. Granite used in New York is shipped from quarries in New England and the West. Its free silica content ranges from about 25 to 35 per cent. It is received in rough blocks

* Studies made by the Public Health Service in Barre, Vt., in 1924–1926 showed that practically all the granite workers had well advanced silicosis after 10 years, while the death rate among them for tuberculosis alone exceeded the death rate for all causes in the general population. Previously, in 1922, Hoffman had emphatically called attention to the high death rates in the industry and commended it particularly to consideration on the part of the state, the medical profession and the labor organizations directly concerned.

Surfacing machine in operation. See dust sample No. 8, Plant A.

which are cut when necessary to the desired size on circular saws using steel grit and water. Carborundum saws with water may be used for trimming. After this preliminary treatment the blocks are suitably finished according to their purpose and destination and it is in the process of producing finishes of various kinds that the dust hazard in this industry occurs.

Finishing is done by surfacing machines and hand pneumatic tools which, about 30 years ago, began to replace the old time hammer and chisel. The surfacing machines are used for large plain surfaces where no design or edging is required. They are essentially pneumatic hammers, the particular size and shape of hammer desired being fitted into a movable arm with a piston operated at the rate of some 5,000 blows per minute. The operation is dry and the amount of dust produced is great, sometimes sufficient to envelop the operator completely.

The hand machines also are operated by compressed air. The machine is held in the operator's hand and with his face 12 to 18 inches away he guides it over the surface of the stone. Chisels of various sizes are the tools most commonly used in the hand machines. The amount of dust produced by them is considerable and, owing to the proximity of the operator's face, he gets its full effect. In addition to the dust created in operation, operators add materially to the hazard themselves by blowing off dust which has accumulated on the surface of the stone with the exhaust from their tools.

Polishing is usually done with polishing machines using shot, carborundum grains, or felt with water and is not a dusty process. Sometimes, however, small carborundum wheels are attached to the hand tools for polishing smaller stones. This operation is extremely dusty, and wetting the stone which is sometimes resorted to, is entirely ineffective in allaying the dust.

In addition to surfacing, finishing,

and polishing, lettering by means of sandblasting is done in almost all stone yards. A sandblast cabinet is required for the work, but owing to improper maintenance, dust may be found escaping in large quantities and adding to the hazard of those working in the vicinity.

DUST COUNTS IN TWO REPRESENTATIVE YARDS

Studies of the dustiness of representative operations were made in two typical yards, A and B, by W. J. Fehnel of the Industrial Health Department of the Metropolitan Life Insurance Company. The results are given in Tables I and II. The dust sampling and counting were done according to the standard technic of the U. S. Public Health Service, using the Greenburg-Smith Impinger. Particle size measurements of the dust were made by making micro-photographs under a high dry magnification and further enlarging the negatives by projection. It has been demonstrated repeatedly that no silica particles exceeding 10 microns in greatest diameter enter the lung tissue, and for this reason it is the general practice to consider as hazardous only dust particles under 10 microns. A micron equals one-millionth part of a meter or one-thousandth part of a millimeter. From 98.60 to 99.95 per cent of the particles were found to be less than 10 microns in their greatest diameter.

In the investigation of granite cutting

TABLE I

DUST COUNTS MADE AT PLANT A

Sample No.	*Station*	*Date*	*Cu. Ft. Air Sampled*	*Millions of Dust Particles per Cu. Ft. Air Sampled*	*Millions of Dust Particles, Less than 10 Microns, Per Cu. Ft. Air Sampled*	*Remarks*
1	Alongside No. 1 gang saw	6/22/33	44.0	8.0	7.9	1 man at this operation; saw motor driven; steel shot used as abrasive
2	Hand surfacing	"	35.0	26.0	24.7	Pneumatic tool and hand hammer; 9 point tool
3	Hand polishing	"	9.2	87.0	86.9	Rotor air tool used
4	Hand surfacing	"	15.3	209.0	206.6	4 point tool; 1 man, others close by
5	Hand chipping	"	23.5	44.0	43.6	1 man at this operation
6	Machine polishing	"	42.3	7.0	6.9	1 man at this point; steel shot used as abrastive
7	Polishing mill	"	20.0	10.0	9.9	1 man at this machine
8	Alongside surfacing machine	"	9.4	681.0	663.9	Bush hammer used
9	" "	"	9.4	2,596.0	2,531.1	4 point tool used
10	Between 2 sand blasters	6/27/33	18.8	30.0	29.5	Sandblasters stand outside cabinet

TABLE II

DUST COUNTS MADE AT PLANT B

Sample No.	Station	Date of Sampling	Cu. Ft. Air Sampled	Millions of Dust Particles per Cu. Ft. Air Sampled	Millions of Dust Particles, Less than 10 Microns in Greatest Diameter per Cu. Ft. Air Sampled	Remarks
1	Hand surfacing—split chisel in use	12/5/33	24.0	73.3	70.0	Exhaust from pneumatic tool used to blow dust from stone
2	Hand chipping	"	23.0	82.5	79.2	.....
3	Hand surfacing—4 point tool in use	"	23.0	79.0	75.84	Whisk broom used to brush dust from stone
4	Hand surfacing—split chisel and bush hammer in use	"	40.0	25.0	24.0	Exhaust from pneumatic tool used to blow dust from stone
5	General air in cutting shed of monumental dept.	"	26.0	21.5	20.64	10 men working in this shed, one of whom wears a small respirator which only covers the nose
6	Alongside sandblaster	"	23.4	26.0	24.7	Operator works outside cabinet and enters cabinet to change nozzles; waits only about 2 minutes for dust to settle
7	Machine surfacing—4 point tool	12/6/33	23.4	92.3	91.88	Exhaust applied to these machines; dust exhausted to the outside and rear of the shed
8	Polishing mill	"	31.3	6.9	6.62	1 man; steel shot used as abrasive
9	Alongside circular saw	"	35.0	4.8	4.6	2 men at this point
10	General air of cutting shed, building stone dept.	"	39.0	6.8	6.52	.....
11	Alongside sandblaster in shed in yard	"	27.0	9.9	9.7	Operator works outside cabinet and enters cabinet to change nozzles; waits only about 2 minutes for dust to settle
12	Alongside operator of carborundum saw monumental dept.	"	27.6	4.6	4.41	This machine enclosed in room inside cutting shed of monumental works

plants conducted by the U. S. Public Health Service at Barre,[1] it was found that under conditions pertaining there with granite dust containing 35 per cent of free silica, a safe limit of between 9 and 20 million particles of dust, less than 10 microns in longest diameter, per cu. ft. of air could be established. Workers exposed to this degree of dustiness did not appear to show any increase of respiratory disease. Since at the time of the survey of Plant A only granite was being worked, these findings are directly comparable with those of the Barre study.

It can be seen that the only operations where the dust counts could be considered within the limits of safety were those of gang sawing and polishing, both wet operations. The conspicuously high counts at the surfacing machines were due to the lack of any exhaust devices. These machines at one time had been equipped with exhaust hoods and dust collecting apparatus, but the system had not been operated for some time.

The sandblast cabinet permitted considerable seepage from various small openings at the curtains and around the windows. Dust thus escaping exposed not only the operator but other workmen in the vicinity to high dust concentrations.

It will be noted that the dust counts were considerably lower in Plant B than Plant A. This is attributed to the weather conditions at the time of the tests. Plant A was examined on a clear dry day; Plant B on a damp day with a fine mist in the air. However, in Plant B also the only safe operations were those conducted with water, namely polishing and sawing.

In this plant the six surfacing machines were equipped with individual exhaust systems augmented by directing the exhaust from the tool into the exhaust hood placed at a level with the point of dust generation. The practice was to discharge the collected dust into a wooden chamber where the heavier dust settled out and the fine, lighter dust was discharged directly into the atmosphere outside the shed. When the wind blew in certain directions this fine lighter dust was blown back into the breathing zone of the workmen at the various operations in the plant.

Sandblasting in this plant was done in two sand blast cabinets but the curtain and screening did not provide an efficient seal against the escape of fine dust, nor were the cyclone separators, used to entrap the dust exhausted from the sand blast cabinets, efficient in entrapping the fine particles.

The particle size distribution studies made in Plant A, showed that more than 90 per cent of particles were 5 microns or less in size in all operations studied but two. In plant B, on the other hand, the number of particles of 5 microns or less in size averaged 75.5 per cent. This tendency to a slightly higher particle size in plant B was also, in all probability, the result of differences in weather conditions at the time tests in the two plants were taken.

EXAMINATION OF MEN

The coöperation of the stone cutters themselves in examinations was secured by explaining the purpose of the study to the men at their union meetings, and those examined represented a purely voluntary group who were accepted as they came without discrimination as to age, length of service or any other consideration.* Each man was interviewed before his examination and a personal and occupational history was taken. The occupational history covered the place and type of work, the number of years engaged in it, the use of pneu-

* The examinations were conducted at the Bellevue Yorkville Clinic through the courtesy of Dr. Margaret Barnard. Dr. Leonard Goldwater, Chief of the Occupational Disease Clinic of New York University and Bellevue Hospital Medical College, kindly lent his assistance.

matic tools, and the presence of ventilating devices. The personal history included a record of age, birth place, past diseases referable to the respiratory tract, of contacts with persons suffering from tuberculosis, and of the presence and details of symptoms associated with respiratory disease.

After the history taking each man received an X-ray examination of his chest. Two exposures were made in each case for spectroscopic examination. The technic was as follows: distance 48 inches, length of exposure 1/10 seconds, milliamperes 100, voltage varied according to chest thickness.

The physical examination included a record of height, weight, vital capacity, and chest expansion; observation on the presence of clubbing or cyanosis and a physical examination of the chest. Specimens of sputum were sent for examination to the City Board of Health Laboratories in 34 cases. Complete blood counts were made in 20 cases, at the New York State Health Department Laboratories.

In a number of cases where the X-ray examination showed evidence suggestive of tuberculosis which was not confirmed by physical examination or laboratory findings, it was felt that further observation was desirable, and an effort was made to get these men to enter Bellevue Hospital. The effort met with little success, however, since the men did not wish to take time away from work, and less than half a dozen complied. Since the study was made, 2 have been placed under treatment in tuberculosis sanatoria and 1 has died.

CHARACTERISTICS OF GROUP EXAMINED

Nationality—The distribution of the group by nationality is shown below. Italians strongly predominated, constituting 40 per cent of the total. The United States, Sweden, Scotland, Germany, and Ireland furnished another 45 per cent, and the remainder came from a dozen different countries of Europe and South America.

NATIONALITY OF MEN EXAMINED

Country of Birth	*Number*	*Per Cent*
Italy	50	40
United States	16	13
Sweden	14	11
Scotland	11	9
Germany	8	6
Ireland	8	6
Spain	4	3
South America	2	2
Hungary	2	2
Finland	2	2
Other countries	8	6
TOTAL	125	100

Occupation—The occupational classification of workers in these small yards cannot be clear-cut because there is always a good deal of shifting about. Most of the men called themselves cutters, but a cutter may at times operate the surfacing machine or do sandblasting or *vice versa*. Subject to this qualification the occupational distribution is given below.

OCCUPATION OF MEN EXAMINED

Occupation	*Number*	*Per Cent*
Cutter	111	88
Sand blaster	6	5
Polisher	4	3
Surfacer	2	2
Sawyer	1	1
Blacksmith	1	1
TOTAL	125	100

All of the cutters with the exception of one reported the use of pneumatic tools for cutting most of the time, and half of them had never done any cutting by hand. Any hand work had been carried on as a rule in the old country before coming to America. About 10 per cent of the men had cut stone exclusively in New York State, the remainder had spent varying amounts of time in stone yards elsewhere, chiefly in New England and the Middle West. The place of work, how-

ever, would seem to have little bearing upon the incidence of silicosis, since the studies of dust concentrations in New York City yards show them to be entirely adequate to produce the disease.

In the experience of these men ventilating devices for hand pneumatic tools were practically nonexistent. Only one cutter reported any exhaust for this type of work. In several instances lack of exhaust ventilation for machine surfacing was mentioned. The use of masks was reported by only two cutters who wore them on their own initiative.

Results of X-ray Examination—Interpretation of the X-ray appearances in this study followed in general the classification suggested by the Silicosis Committee of the American Public Health Association in which first stage appearances are described as generalized arborization throughout both lung fields with more or less small discrete mottling; second stage appearances as generalized medium sized mottling through both lung fields, and third stage appearances as more intense mottling with larger nodules taking on a conglomerate form so that large shadows are shown corresponding to areas of dense fibrosis.

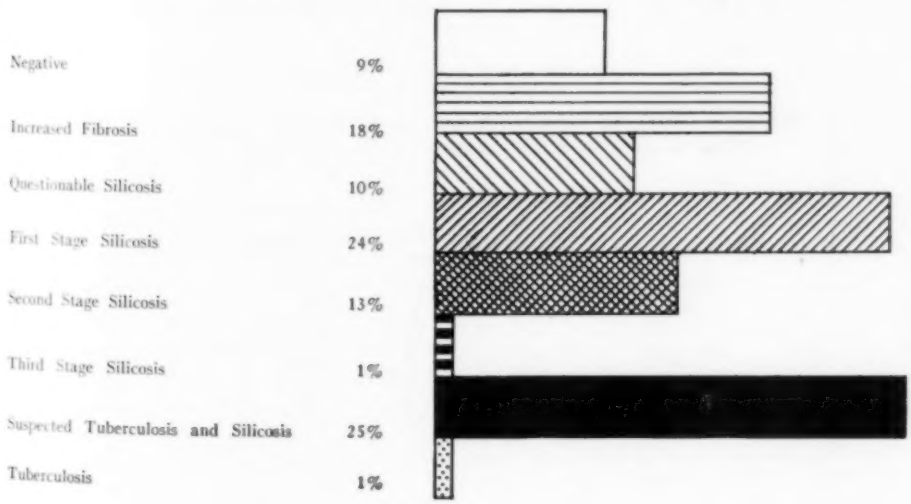
There is always a question as to whether a marked generalized increase in fibrosis without mottling may be indicative of silicosis also. In the classification of silicosis suggested by Pancoast and Pendergrass [2] a non-nodular type of fibrosis occurring in silicosis is recognized. Thompson [3] in his report on silicosis among granite cutters in Barre, Vt., says that mottling was conspicuous by its absence. However, lacking antecedent X-rays to show the development of fibrosis in a previously normal lung after exposure to rock dust, it seems better not to consider cases without at least some nodular fibrosis as silicosis because of the frequency with which generalized fibrosis occurs in lungs when there has been no dust exposure.

The X-ray examination of these men yielded results which are shown graphically in Figure I.

Eleven cases, or 9 per cent, showed

FIGURE I

X-Ray Findings in Group of 125 Granite Cutters



essentially negative lungs. In 22 cases or 18 per cent of the total, increased fibrosis was noted. In 13 cases, or 10 per cent, there was increased fibrosis with a question as to whether or not it represented beginning silicosis. Thirty cases, or 24 per cent, showed silicosis in an early stage. Sixteen cases, or 13 per cent, showed second stage silicosis. There was 1 case of simple third stage silicosis, and 1 of apparently early uncomplicated tuberculosis.

TUBERCULOSIS AND SILICOSIS

There were 31 cases or *25 per cent of the total in which signs suggestive of tuberculosis with silicosis were found.* In 13 of these the signs were considered to constitute definite evidence of tuberculosis. In 11 the signs were thought to indicate probable and in 7 possible tuberculosis where further study would be necessary for a definite diagnosis.

The silicosis in this group of 31 appeared to be advanced in three-fourths of the cases. The tuberculosis found was uniformly of the chronic fibroid type affecting the apices in every case and involving the bases also in only 4. Definite cavity formation was found in 5 instances. In another 7, small areas of rarefaction were present which may have represented either cavity formation or bullous emphysema.

This apical type of tuberculosis with silicosis is considered by Gardner from his studies of silicotic lungs to represent an early focus which has been reactivated or not permitted to heal under the influence of dust, rather than a new infection occurring at the time of dust inhalation. From the number of apparently latent cases and the relatively good condition of many of those with definite signs, the infection was shown to be mild even if widespread. The type of tuberculosis reported as constituting an outstanding group among the Barre granite cutters, namely that with a sudden onset, rapid course, and predominatingly basal lesions, was not found in this study.

The extent to which tuberculosis figures as a cause of death among granite cutters in this state can be seen from Table III where a comparison is shown of the tuberculosis mortality rates among granite cutters and all adult males in New York for the years 1928 to 1932.

In the tables which follow the total group is presented in sub-division according to the X-ray findings. In the sixth group, " tuberculosis and silicosis," all cases showing either definite, probable, or possible evidence of tuberculosis are included.

Age.—The distribution of the group

TABLE III

TUBERCULOSIS MORTALITY RATES PER 100,000 FOR GRANITE CUTTERS AND ALL MALES 20 YEARS AND OVER IN NEW YORK STATE BY YEARS, 1928–1932 *

Year	*Union Membership*	*No. Deaths from Tuberculosis*	*Tuberculosis Death Rates per 100,000 Cutters*	*Tuberculosis Death Rates per 100,000 Males 20 Years and Over*
1928	1,357	7	515.8	117.0
1929	1,500	10	666.6	113.2
1930	1,500	12	800.0	107.7
1931	1,500	8	533.3	103.5
1932	1,350	4	296.2	97.6

* Figures are from the records of The Granite Cutters International Association of America and the New York State Dept. of Health, Division of Vital Statistics.

TABLE IV

AGE IN RELATION TO X-RAY FINDINGS

	Negative		*Increased Fibrosis*		*Questionable Silicosis*		*First Stage Silicosis*		*Second Stage Silicosis*		*Tuberculosis and Silicosis*		*Total Men Examined**	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Totals	11	100	22	100	13	100	30	100	17	100	31	100	124	100
Yrs.														
Under 25	4	36			1	8							5	4
25–29	3	27	4	18	2	15	2	7			2	6	13	10
30–34	2	18	7	32	1	8	4	13					14	11
35–39			1	4	3	23	5	17	1	6	2	6	12	10
40–44			1	4	3	23	12	40	4	24	6	19	26	21
45–49			3	13	1	8	5	17	1	6	5	16	15	12
50–54	2	18	2	9	1	8	2	7	4	24	8	26	19	15
55–59					1	8			3	18	2	6	6	5
60–64			1	4					2	12	5	16	8	6
65–69			2	9					2	12			4	3
70–74			1	4									1	0.8
75–79											1	3	1	0.8

* In this and the two following tables the 1 case of simple tuberculosis is omitted and the 1 case of simple third stage silicosis is included in the second stage group.

according to age and the relation between age and X-ray findings is shown in Table IV.

The average age in the negative group was 30 years. In the "increased fibrosis," "questionable silicosis," and "first stage silicosis" groups it ranged in the vicinity of 41 years; in the group showing second stage silicosis it was 57, and in the group with evidence of tuberculosis and silicosis it was 50 years.

Length of Exposure to Dust—Three of the men examined had been exposed under 5 years; these cases fell in the "negative" and "increased fibrosis" groups. Three had been exposed over 50 years; these cases fell in the "second stage" and "tuberculosis with

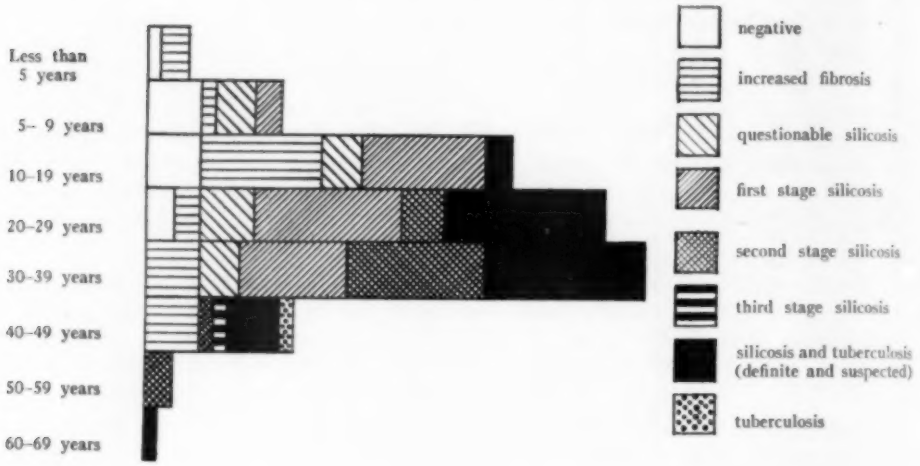
TABLE V

LENGTH OF EXPOSURE IN RELATION TO X-RAY FINDINGS

Length of Exposure	*Negative*		*Increased Fibrosis*		*Questionable Silicosis*		*First Stage Silicosis*		*Second Stage Silicosis*		*Tuberculosis and Silicosis*		*Total Men Examined*	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Totals	11	100	22	100	13	100	30	100	17	100	31	100	124	100
Yrs.														
Under 5	1	9	2	9									3	2
5– 9	4	36	1	4	3	23	2	6					10	8
10–19	4	36	9	38	3	23	9	30			2	6	27	21
20–29	2	18	2	9	4	30	11	36	3	18	12	38	34	27
30–39			4	18	3	23	8	26	10	62	12	38	37	29
40–49			4	18					2	12	4	12	10	8
50–59									2	12			2	2
60–69											1	3	1	1

FIGURE II

X-RAY FINDINGS IN RELATION TO LENGTH OF EXPOSURE



silicosis" groups, as will be seen from Table V. Among the cases showing first stage silicosis, more fell in the 20 to 29 year exposure group than any other, though 2 had been exposed less than 10 years. Among the cases with second stage silicosis more fell in the 30 to 39 year exposure group than in any other. Among those with silicosis and tuberculosis the majority had been exposed from 20 to 39 years. The cases showing "questionable silicosis" were equally distributed over all exposure groups from 5 to 39 years.

The picture given is one of a slowly developing type of silicosis which may show its first stages after anywhere between 5 and 40 years, and tends to become advanced with a marked tendency to be complicated with tuberculosis after 20 years' exposure.

Past History—The history of past respiratory disease revealed a slightly greater frequency of influenza and bronchitis in the group with signs suggestive of tuberculosis and silicosis. This group and the one with second stage silicosis also reported pleurisy with greater frequency than the other groups. Known contacts with cases of tuberculosis were reported by 4 men, 18 per cent, whose X-rays showed fibrosis; 3, 10 per cent, of those showing first stage silicosis; 1 showing second stage silicosis, and 2, 6 per cent, with evidence of tuberculosis and silicosis.

So far as symptoms and physical signs are concerned this study contributed little to what has been found repeatedly in other similar investigations, unless it be to reëmphasize the paucity of both.

Symptoms—Dyspnea was the only symptom clearly related to silicosis. It was reported by 50 per cent of those showing second stage silicosis as compared with 9 per cent in the negative group. Three men were incapacitated for work by it at or shortly after the time of examination. Cough and expectoration were reported with as much frequency by those with increased fibrosis as by those with more advanced changes. Hemoptysis was reported in 3 cases where there was evidence of tuberculosis and 1 case showing increased fibrosis. Six cases out of 17, 37 per cent, with X-ray evidence of second stage silicosis, and 13 out of 31,

TABLE VI

Average Physical Measurements in Relation to X-Ray Findings

Average Measurements	Negative	Increased Fibrosis	Questionable Early Silicosis	First Stage Silicosis	Second Stage Silicosis	Tuberculosis and Silicosis
Totals	11	22	13	30	17	31
Height (ins.)	66	68	65	66	66	67
Weight (lbs.)	151	164	161	161	175	156
Standard wgt. for age and height	144	148	147	151	156	158
Actual vital capacity (c.c.)	3,810	3,964	3,338	3,737	3,117	3,419
Percentage of normal vital capacity (c.c.)	92	88	80	88	74	80
Chest expansion (cms.)	6	5	5	5	4	4

TABLE VII

Vital Capacity and X-Ray Findings in 123 Granite Cutters

Vital Capacity	Per Cent Normal	Vital Capacity	Per Cent Normal
Negative			
4,000	99	3,400	86
4,000	99	4,100	94
3,200	79	3,600	91
3,800	94	4,400	98
3,300	79	4,300	95
		4,100	95
Increased Fibrosis			
4,250	103	4,200	99
4,200	99	3,600	86
4,200	92	3,600	87
3,600	83	4,200	100
3,450	84	3,100	76
4,450	104	5,400	118
3,100	75	5,500	124
3,700	83	5,200	122
4,300	102	4,400	95
3,100	74	2,300	57
		3,500	88
Questionable Silicosis			
3,200	74	2,500	64
3,200	84	3,100	72
3,900	92	3,500	83
3,100	76	3,100	75
4,200	97	3,800	94
3,650	86	3,000	70
		3,200	78
First Stage Silicosis			
4,500	101	2,800	64
4,100	98	3,500	83
3,050	71	2,900	69
3,800	88	3,400	80
4,400	102	3,500	86
4,450	102	3,900	92
4,300	97	5,200	119
First Stage Silicosis (cont.)			
3,300	81	2,500	62
3,800	88	3,000	73
4,300	102	2,800	70
4,100	97	4,300	104
3,400	82	3,800	91
3,600	87	4,500	107
3,400	82	3,800	91
4,000	94	3,800	89
Second Stage Silicosis			
3,400	85	2,200	54
4,100	98	2,000	48
4,000	91	3,400	81
3,300	79	2,500	62
4,200	94	4,300	97
2,100	53	3,200	72
3,700	87	3,000	71
3,800	88	3,700	88
		3,000	71
Tuberculosis with Silicosis			
4,000	93	4,500	98
3,400	76	3,000	74
3,500	80	3,200	75
4,300	100	4,500	100
2,900	68	3,000	74
2,600	67	3,800	87
3,400	84	4,500	100
3,500	82	2,900	66
3,100	74	3,800	94
3,900	89	3,700	91
3,100	79	3,000	74
3,300	78	4,400	105
3,400	84	4,300	95
2,500	59	4,300	100
2,500	60	800	20
		3,200	79

42 per cent, with evidence of tuberculosis and silicosis complained of no respiratory symptoms whatever.

Appearance—With very few exceptions the men were of robust appearance and very well nourished. Overweight was the rule except in the group showing evidence of tuberculosis. In this the average weight for the group approximated the standard for its age and height. Build tended distinctly toward the short and stocky as can be seen from the average heights and weights given in Table VI. The same table shows the average actual vital capacity for each group and the average per cent of normal calculated on the basis of height.

Vital Capacity—In general, the per cent of normal vital capacity diminished with the increase in fibrosis, but in each group there were marked individual variations, dependent to some extent doubtless on degree of coöperation or on practice. Table VII gives the vital capacities and percentages of normal for 123 individuals arranged by X-ray groups.

In the negative group there were none whose vital capacity was less than 75 per cent of the calculated normal. In the group showing increased fibrosis 14 per cent had vital capacities 75 per cent or less of normal; in the "questionable silicosis" group there were 38 per cent with this degree of limitation; in the "first stage silicosis" group 20 per cent; in the "second stage silicosis" group 32 per cent. No relationship was found between subjective dyspnea and diminished vital capacity.

Chest Expansion—Chest expansion in all groups, including the negative, was less than normal. It averaged 6 cm. for this group, 5 cm. for those with first stage silicosis, and 4 cm. for those with second stage silicosis and silicosis with tuberculosis. The limitation of expansion was doubtless related to the predominating broad-chested type as well as to fibrosis.

Clubbing—Clubbing of the fingers or definitely curved nails were found in one-half of the cases with evidence of tuberculosis and silicosis in contrast to 9 per cent in the negative group and 11 per cent in the group with second stage changes.

Lung Findings—Lung findings were variable and not of material aid in making a diagnosis of silicosis. Negative lungs were reported in approximately one-third of the cases showing second stage silicosis by X-ray. The presence of emphysema in many cases masked evidence of other changes. In 7 of the 31 with suggestive evidence of tuberculosis by X-ray, persistent râles were noted. Altogether clinical corroboration of the presence of tuberculosis by symptoms and physical signs was found in 12 of the 31 suspected cases.

Blood Counts—Complete blood counts were made in 20 cases including both silicotic and non-silicotic individuals, but did not show any significant variations from normal, and the average red blood cell count, white blood cell count, percentage hemoglobin, polymorphonuclears and lymphocytes were almost identical in all groups.

Sputum—Of the 34 specimens of sputum examined 2 were positive. Fifteen of the 34 came from the group suspected of tuberculosis. It seems quite possible that a higher proportion of positives would follow repeated examinations of concentrated specimens.

SUMMARY

Studies made in two representative stone yards showed that dust counts exceeded limits of safety in all operations except machine polishing and sawing.

Examination of 125 granite cutters revealed evidence of silicosis in 78 cases, or 62 per cent, of the group examined. In 41 cases, or 33 per cent,

the condition was advanced. In 12 cases, or 10 per cent, there was definite evidence of tuberculosis also, and in 19 cases, or 62 per cent, of the group exothers, 15 per cent, it was suspected.

The study shows that the dust hazard in granite cutting shops about New York City is not controlled, and that the men are subjected in the course of their daily work to conditions which are so damaging to health as to demand immediate correction.

POSSIBILITIES OF CONTROL

There is no doubt that the serious hazard existing in stone yards can be controlled if there is a will to control it. The methods of control are the well known ones of local exhaust ventilation, direct protection of the workers by masks, and good housekeeping. The will to employ these methods must be aroused by education, and reënforced when necessary by law.

Exhaust Ventilation—Equipment can be and has been designed to remove dust from the point of origin in stone yards which is efficient and durable. The U. S. Public Health Service published A Study of the Efficiency of Dust Removal Systems in Granite-Cutting Plants in *Public Health Reports,* October 18, 1929, in which it was found as a result of a careful study of exhaust ventilation in two yards that in most instances it was possible to keep the dust concentration in the air of the sheds below 10 million particles per cu. ft. Exhaust for both surfacing machines and hand pneumatic tools is described.

Hatch, Drinker, and Choate in A Laboratory Study of the Design of Dust Control Systems for Use with Pneumatic Granite Cutting Tools appearing in the *Journal of Industrial Hygiene,* March, 1930, described the construction of devices for dust control in the use of pneumatic hand tools and surfacing machines which will maintain a maximum dust concentration of 10 million particles per cu. ft. Since the publication of the above article, one of the authors has installed a system which has demonstrated over a period of time its ability to maintain low dust concentrations in a large stone yard which is entirely enclosed.

The cost of such equipment is not prohibitive and its principles do not differ from the well known ones of exhaust ventilation wherever applied. It is true that a certain amount of intelligent coöperation on the part of the worker is necessary for securing best results, but this is not by any means impossible of achievement where the employer himself is interested and alert.

Masks—Where exhaust ventilating equipment is not installed, an alternative is direct protection of workers by the use of masks. Positive pressure masks or helmets supplying the wearer with clean air from an outside source are to be preferred wherever they are practicable, that is to say, where the worker's radius of movement is not over 10 feet. Operators on sandblasting and large surfacing machines could very well be so protected. For other workers who may be moving from place to place simple filter masks are recommended.

The Bureau of Mines' study, *Dust Respirators, Their Construction* and *Filtering Efficiency* * shows that an efficient filter for dust particles, even those as small as 0.27 microns in diameter, can be made from a sufficient number of plies of muslin, canton flannel, cheese cloth, or absorbent cotton, and a number of satisfactory respirators using this principle are obtainable in the market. When masks are used, one man must be assigned to the duty of distributing, collecting, cleaning, replenishing and generally keeping them in good condition; otherwise carelessness in their use and a false sense of protection will result.

* *Technical Paper 394.*

Good Housekeeping—Next to exhaust ventilation and direct protection by masks, good housekeeping plays an essential part in control of the dust hazard. Under this heading is included proper maintenance of equipment and the avoidance of any unnecessary dust exposure which might result from ill considered arrangements. An example of the latter found in one of the yards investigated, for instance, was the reconditioning of sand by screening which took place adjacent to the sandblast cabinet in a position which exposed a number of nearby workers to the dust so created. Poor maintenance, lack of good housekeeping was responsible for the fact that sandblast cabinets leaked and dust exhausted from the surfacing machines blew back under certain conditions into the yard. Again, as in the case of care of masks, attention to such details must be the business of somebody who understands the hazard and *wants* to control it.

Legislation—To create the will to control the hazard, continuous persistent dissemination of information is necessary, plus the stimulus of vigorously administered law. In New York State there is a Code of the Labor Department [4] having, as do all such codes, the force of law which specifies "Every granite working tool or machine shall be connected to an exhaust system including a separator that will remove all dust created by such machines or tools, in so far as it is practicable, at its point of origin."

The value of such a code strictly enforced is apparent. The trouble has been in New York State in the past that the seriousness of the hazard has not been thoroughly appreciated and observance of the Code has not been insisted upon.

Finally, the most important factor of all in stimulating the institution of preventive measures in this or any industry with a similar hazard would be the inclusion of silicosis in the Workmen's Compensation Law. To achieve this end, those who are interested in silicosis prevention should bend every effort.

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Diphtheria Studies: 1. The Significance of the Schick Test in the Adult*

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OUR knowledge of the Schick test is limited almost entirely to data on the reaction in children. Little study has been made of the reaction in adults, especially older adults. Knowledge of the significance of the test in this group is of practical importance to the authorities responsible for immunization in institutions for adults. Furthermore, a detailed knowledge of the Schick reaction in relation to age would add to our understanding of the immunology of diphtheria.

There are indications that immunity to diphtheria in adults depends in part upon some factor not measured by the Schick test. Since the decrease of diphtheria with age is more rapid than would be expected from a knowledge of Schick reaction distribution in adults, it seemed possible that a comparison of blood antitoxin concentrations with Schick reactions might throw light on this discrepancy. We also desired information on the following points:

1. The level of antitoxin at which all adult Schick reactions are negative, and below which all are positive.
2. The immunologic significance of the pseudo and combined reactions, and of the type of tissue reaction (necrosis, vesiculation, pigmentation and erythema).
3. The relationship between the Schick reaction and antitoxin concentration in adults artificially immunized, as contrasted with adults naturally immunized.
4. The relationship of age to the correlation between antitoxin, Schick reaction, and tissue reaction, both before and after antigenic stimulation.

In children there is probably no antitoxin concentration (as determinable by available methods) below which all are positive to the Schick test, though as Dudley [1] points out in his critical review of the literature on the Schick test, most authors accept Schick's original figure of 0.033 unit as the "threshold." The results of Ramon and Debré [2] agreed with those of Schick. However, other critical levels are reported. In 1923, the Medical Research Council of Great Britain [3] considered 0.025 to 0.017 unit as the dividing range. Schick [4] in 1924 indicated that 0.005 unit was sufficient to render an individual Schick negative. Kellogg and Stevens [5] found that 20 to 25 per cent of those receiving toxin-antitoxin became Schick negative with a final antitoxin level of less than 0.01 unit. Jensen [6] believes that the Schick reaction does not divide children into high and low antitoxin groups which are mutually exclusive. He found that 9 per cent of the negatives, after antigenic stimulation of a group of positive children, had less than 0.01 unit, but

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

that 100 per cent of the positives had less than 0.003 unit. Flood believes that a positive Schick test always indicates susceptibility, but that a negative may or may not indicate immunity. Schick, Von Groer and Kassovitz [8] found that 0.002 unit always gave a negative Schick and 0.005 always a positive. Kolmer and Moshage [9] found it required at least 0.05 unit for a person to become Schick negative. Pockels [10] found negative Schicks with less than 0.01 unit. Thiele [11] found that of 132 negatives 22 per cent had less than 0.05 unit of antitoxin. Curth and Lorenz [12] found that all Schick positive children had less than 0.04 unit, but that of 25 Schick negative children, 7 had less than 0.01 unit. Henseval and Clevers [13] found that guinea pigs were negative to the Schick test when there was 0.005 unit, and positive when there was 0.0033 unit. Weichsel [14] found that guinea pigs having 0.01 unit or more had negative Schick reactions. All with less than 0.01 unit were positive. He found that resistance to conjunctival infection with an old laboratory strain of *C. diphtheriae* correlated with the Schick reaction. However, resistance to conjunctival infection with a highly virulent strain occurred only when the pigs were negative to 1/25 of an m.l.d. instead of the 1/50 m.l.d. used in the Schick test, and when the antitoxin concentration was from 0.03 to 0.05 of a unit of antitoxin. Complete resistance to the infection was obtained only if the pigs were negative to 1/10 m.l.d.

Evidence has been submitted by several workers listed above to show that persons with negative Schick reactions, and as little as 0.01 unit of antitoxin, are not uncommon. In view of this the following gains in interest: That Park [15] stated in 1926 that he had never seen an undoubted case of clinical diphtheria in a child who had recently had a negative Schick; that O'Brien, Okell, and Parish [16] observed only 18 frank but mild cases in 20,000 Schick negative persons; and that Lane and Forsbeck [17] and Lane [18] reported that of the 263 diphtheria deaths investigated in Massachusetts in 1926 and 1927, none occurred in Schick negative persons.

One is led to conclude that the negative test may sometimes indicate a non-antitoxic immunity, or an immunity which is not represented merely by the concentration of antitoxin in the blood stream. On the other hand, there is a widespread belief that with increasing age a positive Schick reaction has less and less significance as an indication of susceptibility.

Likewise the work of Von Groer and Kassowitz,[19] Kuttner and Ratner,[20] Ruh and McClelland,[21] and Cooke and Sharma [22] demonstrating that the positive Schick reaction in a newly-born infant is often smaller and less intense than in the mother with the same concentration of antitoxin, seems to indicate that the Schick reaction may be influenced by factors other than the blood antitoxin concentration at the time of the test.

It seemed to us that a simultaneous determination of antitoxin concentrations and Schick reactions in the adult might throw further light on this problem.

METHODS

FIELD TECHNIC

All observations were on male adult patients in two Michigan hospitals for the insane.* Data from the two hospitals were routinely compared and found to be essentially similar. Blood was drawn not more than 24 hours before doing the Schick test. At first,

* We are indebted to Dr. Edmund A. Christian, Medical Superintendent of Pontiac State Hospital, and to Dr. R. Phillip Sheets, Medical Superintendent of Traverse City State Hospital, for their coöperation and assistance.

bloods were drawn with sterile dry syringes and transferred to vials which were then stoppered and refrigerated. Later, bloods were drawn directly into vials with suction apparatus.[23] This expedited the collection of blood and reduced contaminations. Schick reactions were read on the 4th and 6th day at one hospital, and on the 5th and 7th day at the other. Since analysis showed no significant differences, the 5th day reading in one hospital and the 6th day reading in the other were selected for this paper. Schick tests were done on the left forearm, controls on the right. Reactions were read by any one or more of the group after it was found that all members agreed as to interpretation of kind, size, intensity, and other characteristics.

Kind of Schick test as used in this article refers to the classification of reactions into negative, pseudo, combined, and positive. The reactions as to size were divided into 5 groups as follows:

Group	*Diameter in Millimeters*
1	0– 9
2	10–19
3	20–34
4	35–44
5	45+

The complete Schick reading was represented by two numbers, the first giving the size of the control, the second the size of the test. Below are listed the symbols of the 15 possible readings excepting those occasional irregular readings in which the control reaction was larger than the test.

Negative	*Pseudo*	*Positive*	*Combined*
11	22	12	23
	33	13	24
	44	14	25
	55	15	34
			35
			45

Thus, a given symbol tells at once the kind of reaction as well as the approximate size of both the test and control reactions. After a few readings the group was able to agree as to the correct symbol to assign. Naturally, if the size were 20 or very close to 20 mm. the symbol assigned by two observers might be " 2 " in one case, and " 3 " in the other. Furthermore, there were a few border-line reactions which required common sense interpretation, such as follows:

Control	*Test*	*Interpretation*
0 mm.	9 mm.	Positive rather than negative
19 mm.	21 mm.	Pseudo rather than combined
20 mm. faint reaction	20 mm. intense reaction	Combined rather than pseudo

The color of the Schick reaction was recorded as follows:

1. Flushing, a pink which disappears with pressure
2. Red, the red of the typical Schick reaction
3. Bright red, the " angry " red associated with inflammation
4. Purple, perhaps a reaction to trauma
5. Brown, the brown of pigmentation

In addition, vesiculation, induration, necrosis, swelling, and desquamation were recorded. Reactions occurring as two-shade zones were also recorded.

One, two, or three subcutaneous injections of toxoid were made at the time of Schick readings and thereafter at 3 week intervals. The post-antigenic stimulation Schicks were done 3½ months after the first toxoid inoculation at one hospital and 7½ months after the first toxoid inoculation at the other. Contaminated specimens were discarded. Sera were not separated from their blood clots at uniform intervals after procurement. Antitoxin titrations were made * according to Fraser's [21] modification of Römer's technic. Guinea pigs were used for test animals. Twenty inoculations were made on each pig.

* We wish to acknowledge the assistance of J. W. Glassen, H. C. Hollon, H. Kibbe and A. H. Tallman.

TABLE I

RELATIONSHIP OF ANTITOXIN CONCENTRATION TO SCHICK REACTION PREVIOUS TO ANTIGENIC STIMULATION

Units of Antitoxin per c.c. of Serum	Number of Persons					Percentage Distribution of Antitoxin Concentration in Each Schick Group				Percentage Distribution of Schick Reactions in Each Antitoxin Group				
	Pos.	Com.	Ps.	Neg.	Total	Pos.	Com.	Ps.	Neg.	Pos.	Com.	Ps.	Neg.	Total
0.001*	127	7	5	9	148	82.4	63.6	6.9	2.9	85.8	4.7	3.4	6.1	100.0
0.002	10	0	1	7	18	6.5	0.0	1.4	2.2	55.6	0.0	5.6	38.8	100.0
0.006	2	0	2	13	17	1.3	0.0	2.8	4.1	11.8	0.0	11.8	76.4	100.0
0.010	2	0	1	14	17	1.3	0.0	1.4	4.5	11.8	0.0	5.9	82.3	100.0
0.030	0	0	2	29	31	0.0	0.0	2.8	9.2	0.0	0.0	6.5	93.5	100.0
0.050	4	0	5	26	35	2.6	0.0	6.9	8.3	11.4	0.0	14.3	74.3	100.0
0.075	0	1	0	17	18	0.0	9.1	0.0	5.4	0.0	5.6	0.0	94.4	100.0
0.100	1	0	6	24	31	0.7	0.0	8.3	7.6	3.2	0.0	19.3	77.5	100.0
0.100	8	3	50	176	237	5.2	27.3	69.5	55.8	3.4	1.3	21.1	74.2	100.0
Totals	154	11	72	315	552	100.0	100.0	100.0	100.0	27.9	2.0	13.0	57.1	100.0

* The antitoxin concentrations of less than 0.002 units per c.c. of serum have for the purposes of analysis been assumed to average 0.001. Actually the relatively large number of antitoxin titrations below 0.002 point to a much lower average.

The pre-antigenic stimulation sera were titrated to 0.1 unit per c.c. Since 43 per cent of sera contained more than this amount of antitoxin the post-antigenic stimulation sera were titrated to 7.5 units. Levels for titration were chosen to include the various "Schick levels of antitoxin" reported by other workers. But examination of our results shows that for determining the distribution of antitoxin concentrations it would have been better to have covered a greater range. Limitations of the methods for antitoxin titrations however make determinations below 0.002 of doubtful value.

MATERIALS

Schick material:	1/50 m.l.d. per 0.1 c.c.
Toxoid	T.C.S. Hosp. Lot # 17, 8 L_f's per c.c.
	P.S. Hosp. Lot. # 20, 5 L_f's per c.c.

RESULTS AND DISCUSSION — SCHICK TEST AND ANTITOXIN CONCENTRATION

In Table I are listed the number of persons at each antitoxin level and in each Schick group previous to antigenic stimulation.* The percentage distribution of Schick reactions by antitoxin levels is presented, as well as the percentage distribution of antitoxin levels by kind of Schick reaction. As expected, the positive reactions are mostly at lower antitoxin levels, and most of the negative reactions at upper levels. With enough figures to be significant we find that with each increase in the antitoxin concentration the percentage of negatives increases. Thus at 0.001,† 6.1 per cent of the Schick reactions are negative, at 0.002, 38.8 per cent are negative, and at 0.006, 76.4 per cent are negative. From this point on there is no significant change. If however the percentage of pseudos is added to the negatives, we find a continued trend toward 100 per cent immunity as measured by the Schick test. The percentage of pseudos also increases with

* Throughout this paper antigenic stimulation refers to artificial stimulation with toxoid or with Schick test material.

† Figures representing antitoxin concentrations always refer to units per c.c. of serum.

TABLE II

RELATIONSHIP OF ANTITOXIN CONCENTRATION TO SCHICK REACTION AFTER ANTIGENIC STIMULATION OF SCHICK POSITIVE PERSONS

Units of Antitoxin per c.c. of Serum	Number of Persons					Percentage Distribution of Antitoxin Concentrations in Each Schick Group				Percentage Distribution of Schick Reactions in Each Antitoxin Group				
	Pos.	Com.	Ps.	Neg.	Total	Pos.	Com.	Ps.	Neg.	Pos.	Com.	Ps.	Neg.	Total
0.001	42	2	1	7	52	79.2	66.7	20.0	9.6	80.9	3.8	1.9	13.4	100.0
0.002	7	0	0	4	11	13.2	0.0	0.0	5.5	63.6	0.0	0.0	36.4	100.0
0.006	2	0	0	3	5	3.8	0.0	0.0	4.1	40.0	0.0	0.0	60.0	100.0
0.010	1	0	0	6	7	1.9	0.0	0.0	8.2	14.3	0.0	0.0	85.7	100.0
0.030	0	0	0	6	6	0.0	0.0	0.0	8.2	0.0	0.0	0.0	100.0	100.0
0.050	0	0	0	12	12	0.0	0.0	0.0	16.3	0.0	0.0	0.0	100.0	100.0
0.075	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
0.100	0	0	0	3	3	0.0	0.0	0.0	4.1	0.0	0.0	0.0	100.0	100.0
0.250	1	1	1	17	20	1.9	33.3	20.0	23.5	5.0	5.0	5.0	85.0	100.0
1.250	0	0	1	9	10	0.0	0.0	20.0	12.2	0.0	0.0	10.0	90.0	100.0
2.500	0	0	0	2	2	0.0	0.0	0.0	2.8	0.0	0.0	0.0	100.0	100.0
7.500	0	0	1	1	2	0.0	0.0	20.0	1.4	0.0	0.0	50.0	50.0	100.0
>7.500	0	0	1	3	4	0.0	0.0	20.0	4.1	0.0	0.0	25.0	75.0	100.0
Totals	53	3	5	73	134	100.0	100.0	100.0	100.0	39.5	2.2	3.7	54.6	100.0

each increase in antitoxin concentration, but our figures are too few to determine whether the percentage of pseudos tends to increase at a faster or slower rate than the percentage of negatives.

In Table II is shown the relationship between the Schick reaction and antitoxin concentration after antigenic stimulation of Schick positive persons. It may be noted that whereas there is considerable scatter of the positives over the antitoxin range before antigenic stimulation, the positives are more concentrated at the low antitoxin levels after stimulation. With one exception, no positive had more than 0.01 unit after antigenic stimulation.

These data are summarized in Table III in such a way as to show the discrepancies. Perhaps the figures point

TABLE III

THE DISCREPANCY BETWEEN THE SCHICK REACTION AND ANTITOXIN CONCENTRATION IF 0.03 UNIT PER C.C. BE CHOSEN AS THE DIVIDING LEVEL

	Schick Positives with 0.03 or More Units of Antitoxin Per c.c.			Schick Negatives with Less Than 0.03 Units of Antitoxin per c.c.		
	No.	% of Total Schick Tested	% of Positives	No.	% of Total Schick Tested	% of Negatives
Before Antigenic Stimulation	12	2.2	7.5	52	9.4	13.4
After Antigenic Stimulation	2	1.5	2.8	21	15.8	24.8

to a difference in the significance of the Schick reaction in naturally and artificially stimulated persons. The percentage of Schick positive persons having at least 0.03 unit of antitoxin is about half as great in those persons who have been artificially stimulated, as in those who have been naturally stimulated. On the other hand, the percentage of Schick negatives with less than 0.03 unit was approximately twice as great in a group after antigenic stimulation as in a group before antigenic stimulation. The difference in the distribution of the positives might be explained as due either to an allergic factor or to a dissimilarity in tissue permeability. The difference in the distribution of negatives might be explained as due to a lack of tissue susceptibility to diphtheria toxin, or as due to a local immunity resulting from increased permeability to antitoxin. These points are discussed later.

In Table IV are listed the results of antigenic stimulation of those persons who were previously Schick positive although having 0.03 unit or more of antitoxin. The 3 persons remaining Schick positive were 3 of the 4 persons who showed a decrease in antitoxin concentration following antigenic stimulation. This perhaps indicates an error in the antitoxin titration either before or after stimulation. It would be a rather odd coincidence, however, that of the 4 such instances, 3 should have occurred in the persons who failed to become Schick negative. In each instance the positives were intense reactions (" 14 "). As has been stated, a number of sera were retitrated with a moderate difference in reading in only 1 of 16.

Most workers fail to find an antitoxin level below which all are positive. Experience with children has shown that most negatives have more than 0.03 unit, most positives less than 0.03 unit. Just what level will give the closest

TABLE IV

RESULT OF ANTIGENIC STIMULATION IN PERSONS WHO WERE PREVIOUSLY SCHICK POSITIVE OR COMBINED ALTHOUGH HAVING 0.03 UNITS OR MORE PER C.C. OF SERUM

Antitoxin Concentration		Schick Reaction		No. of Toxoid Inoculations
Before Stimulation	After Stimulation	Before Stimulation	After Stimulation	
0.050	1.250	Pos. (13)	Neg.	1
0.050	2.500	Pos. (13)	Neg.	3
0.050	5.000	Pos. (13)	No Reading	1
0.100	0.001	Pos. (13)	Pos. (14)	2
0.100	0.001	Pos. (14)	Pos. (14)	3
0.100	0.006	Pos. (13)	Pos. (14)	1
0.100	0.030	Com. (23)	Pseudo (33)	2
0.100	1.875	Pos. (12)	(12) (11)	1
0.100	2.500	Com. (23)	Neg.	3
0.100	5.000	Pos. (12)	Neg.	1
0.100	5.000	Com. (23)	Neg.	1
0.100	7.500	Pos. (12)	Neg.	3
0.100	7.500	Pos. (13)	Pseudo (22)	2
0.100	>7.500	Pos. (12)	Neg.	3
0.100	>7.500	Pos. (12)	Neg.	1
0.100	>7.500	Com. (23)	Neg.	3
0.100	>7.500	Pos. (13)	Neg.	1

approach to mutually exclusive groups has not yet been agreed upon. In our series the positive reactions both before and after antigenic stimulation are a better index of the underlying antitoxin concentrations than are the negatives. Persons remaining Schick positive after antigenic stimulation are more likely to have an antitoxin concentration below 0.03 unit than are Schick positive persons previous to antigenic stimulation. On the other hand, in those Schick positive persons who had been antigenically stimulated, a resulting Schick negative would appear to be a less reliable indication that the antitoxin concentration is more than 0.03 unit than it is in persons naturally Schick negative. It would seem from these figures that with antigenic stimulation we created a group of Schick negatives having a lower mean antitoxin level than has a naturally Schick negative group. This difference may be due to a tendency for antitoxin increase to lag behind the change from the Schick positive to Schick negative, or perhaps it may represent a fundamental difference in the response to artificial as contrasted with natural antigenic stimulation. The figures also indicate that a person who is Schick positive in spite of a high antitoxin level may become Schick negative after artificial stimulation. Examination of the individual cases bears this out.

ANTITOXIN AND SEVERITY OF SCHICK REACTION

In Tables V and VI it may be noted that with increased intensity of the positive and combined reactions there is an increased probability that the person has less than 0.03 unit. In other words, if our figures are significant, the lower the antitoxin concentration the more severe the reaction.

The " 23 " combined reaction, as one might suspect, is the least reliable index of antitoxin concentration. Exactly 50 per cent of the 14 " 23 " reactions in Tables V and VI were associated with less than 0.03 unit. The " 23 " reading of the six possible combined readings is the one which might actually be a pseudo reaction. Likewise the " 12 " of the four possible positive readings is the one which might actually be a negative. It is of interest then, that these two Schick classifications show the greatest discrepancy with antitoxin concentration. This is true in spite of the fact that when by actual measurement a reaction was a " 23 " but the

TABLE V

DISCREPANCY BETWEEN SCHICK SIZE AND ANTITOXIN CONCENTRATION BEFORE ANTIGENIC STIMULATION

	Kind and Size of Schick Test											Totals
	Neg.	Pseudo			Combined			Positive				
	11	22	33	Total	23	24	Total	12	13	14	Total	
Total Number	319	68	4	72	10	2	12	25	104	27	156	559
No. with Less Than 0.03 Units	43	8	1	9	5	2	7	19	96	26	141	200
% with Less Than 0.03 Units	13	12	25	13	50	100	58	76	92	96	90	...

TABLE VI

DISCREPANCY BETWEEN SCHICK SIZE AND ANTITOXIN CONCENTRATION AFTER ANTIGENIC STIMULATION OF SCHICK POSITIVE PERSONS

	Kind and Size of Schick Test								Totals
	Neg.	Pseudo	Combined	Positive					
	11	22	23	12	13	14	15	Total	
Total Number	78	5	4	11	32	10	5	58	145
No. with Less than 0.03 Units	21	0	2	10	31	10	5	56	79
% with Less than 0.03 Units	27	0	50	91	97	100	100	97	...

difference in diameter was considered to be trifling, the reaction was called a "22" or a "33." The figures are too few of course to be conclusive, but we believe size could be used in gauging the underlying antitoxin.

RESPONSE TO ANTIGENIC STIMULATION

Tables VII and VIII and those following are devoted to the relationship and interrelationship of the Schick test, the antitoxin concentrations, and antigenic stimulation to age. Table VII is concerned with the increase in antitoxin level caused by the stimulus of a single Schick test dose in Schick negative persons. It may be noted that in general, the higher the antitoxin level before antigenic stimulation, the higher the level reached after antigenic stimulation; that the absolute increase is greatest in those in whom the original antitoxin level is highest; and that as the original antitoxin concentration approaches the natural limit the ratio of the final to the original antitoxin concentration decreases.

As has been mentioned elsewhere, there is an error in the first and last groups which makes the series of ratios even more striking than indicated in the table. The choice of the figure 0.001 is deliberately a conservative one, since the concentration of cases below 0.002 points toward a mean figure far below 0.001. Perhaps many of this group have no antitoxin. Thus the ratio of 1:1,630 is probably too small. On the

TABLE VII

CORRELATION BETWEEN ANTITOXIN CONCENTRATION BEFORE AND AFTER ANTIGENIC STIMULATION IN SCHICK NEGATIVE PERSONS

Antigen		Original Antitoxin Concentration								
		0.001	0.002	0.006	0.010	0.030	0.050	0.075	0.100	>0.100
Schick Test Dose	Mean final antitoxin	1.631	0.445	0.330	0.579	0.929	1.167	1.056	1.111	1.287
	Mean increase	1.630	0.443	0.324	0.569	0.899	1.117	0.981	1.011	1.112
	Final A / original A	1630	222	54	57	31	22	13	10	7
	Number of cases	16	5	10	15	27	21	9	19	79
	Mean age	45	41	51	57	49	49	46	53	50

other hand, the pre-stimulation antitoxins were titrated only to 0.1 and consequently the ratio of 1:7 is probably too high.

The original antitoxin group which stands out as distinctly different from the rest in the series is the first one. While the ratio of final antitoxin to original antitoxin is very high as compared to the next highest ratio, it does fall naturally into the series of nine ratios. It is in the large absolute increase of antitoxin that the 0.001 group stands out as an exception. Whereas in the other members of the series the absolute increase of antitoxin is directly related to the original antitoxin level, the 0.001 group, instead of showing the smallest absolute increase, shows by far the greatest. Here then is a group of Schick negative persons who have trifling amounts of antitoxin or perhaps in most cases none, but are capable of responding to slight stimuli with a great increase in the antitoxin concentration. We have no evidence as to the meaning of this phenomenon. If observations by others should confirm our findings, the way is opened to several problems of at least theoretic interest.

It would seem from Table VII and others that with increasing age the Schick reaction tends to become negative more rapidly than does the antitoxin concentration tend to reach the 0.03 level usually considered to indicate immunity.

Turning to Table VIII it may be seen that with Schick positive persons stimulated with a Schick test dose plus one, two or three doses of toxoid, the results are somewhat different, and also less significant, due to a scarcity of data. The antitoxic response, both absolute and relative, is slight as compared with the Schick negatives, in spite of the greater antigenic stimulation. Indeed, in our small series there was a group of 10 (boxed in Table VIII) in which the response was a negative one. The series is a small one, but only 1 of the 10 cases showed an increase in antitoxin concentration, and the cases were restricted to those receiving one or two

TABLE VIII

CORRELATION BETWEEN ANTITOXIN CONCENTRATION BEFORE AND AFTER ANTIGENIC STIMULATION OF SCHICK POSITIVE PERSONS

Antigen		Original Antitoxin Concentration							
		0.001	0.002	0.006	0.010	0.030	0.050	0.075	0.100
Schick Test Dose Plus One Tox. Inoculation	Mean final antitoxin	0.158	0.0002	0.005	0.001	...	3.125	...	....
	Mean increase	0.157	−0.0018	−0.001	−0.009	...	3.075	...	....
	Final A / original A	158	0.9	0.83	0.1	...	62	...	....
	Number of cases	35	4	2	1	...	2	...	....
	Mean age	44	40	47	50	...	52	...	....
Schick Test Dose Plus Two Tox. Inoculations	Mean final antitoxin	0.231	0.001	....	0.006	...	...	...	0.001
	Mean increase	0.230	−0.001	....	−0.004	...	...	...	−0.099
	Final A / original A	231	0.5	....	0.7	...	...	...	0.01
	Number of cases	20	1	....	1	...	...	...	1
	Mean age	43	55	....	50	...	...	...	35
Schick Test Dose Plus Three Tox. Inoculations	Mean final antitoxin	0.151	0.563	....	....	...	2.500	...	....
	Mean increase	0.150	0.561	....	....	...	2.450	...	....
	Final A / original A	151	281	....	....	...	49	...	....
	Number of cases	41	4	....	....	...	1	...	....
	Mean age	44	62	....	....	...	60	...	....

TABLE IX

ESTIMATED DIPHTHERIA CASE RATES PER 100,000 PERSONS WITH POSITIVE SCHICK TESTS*

Age Group	Case Rate per 100,000 Persons in Each Age Group	Case Rate per 100,000 Persons with Positive Schick Tests in Each Age Group	Per Cent Each Positive Schick Test Case Rate is of the 5–9 Rate
5–9	312	709	100
10–14	138	539	76
20–29	70	557	79
30–39	43	407	52
40–49	23	292	41
50–59	12	189	27
60	4	86	12

* These figures are based on over 20,000 cases in Michigan during 1924–1930, and on the percentage of Schick positive persons by age groups as compiled by Hope and Stallybrass in their **A Textbook of Public Health** from Park and Zingher's results. The 15–19 group is omitted because no results for ages 18 and 19 are given in Hope and Stallybrass's tabulation.

toxoid inoculations. The 1 case which increased became Schick negative after one inoculation. Of the remaining 6 receiving one inoculation, 5 remained positive and 1 became negative. With two inoculations all 3 remained positive. In the 0.001 group, in which there is a fairly large series, the advantage of repeated antigenic stimulation is not apparent as far as an increase of antitoxin is concerned. These same persons, however, showed a marked difference in the degree of shift from Schick positive to Schick negative, depending upon the number of toxoid inoculations, as may be noted below:

Antigenic Stimulation	*Per cent of Schick Positive Originally Having 0.001 Unit Which Became Schick Negative After Antigenic Stimulation*
Schick test dose plus one toxoid inoculation	25
Schick test dose plus two toxoid inoculations	58
Schick test dose plus three toxoid inoculations	80

The group with a very low antitoxin concentration before antigenic stimulation, whether positive or negative, was slightly younger than the other groups.

The figures of Park and Zingher show that the shift in Schick reaction from positive to negative in childhood and youth is continued through adult life. In Tables VII and VIII it would appear that the antitoxin concentrations also increase with age.

RELATIONSHIP OF AGE TO THE SIGNIFICANCE OF THE POSITIVE SCHICK TEST

In Table IX are shown estimated case rates per 100,000 positive Schick tests based on Michigan morbidity reports and upon Park and Zingher's data on the age distribution of Schick tests as compiled by Hope and Stallybrass.[25]

We wish to point out that with increasing age the rate rapidly decreases. The application of New York data on the age distribution of positive Schick tests to Michigan case rates in order to obtain case rates among Schick posi-

TABLE X

RELATIONSHIP OF ANTITOXIN CONCENTRATION TO SCHICK REACTION PREVIOUS TO ANTIGENIC STIMULATION, BY AGE GROUPS

Antitoxin Concentration	Age Group	Pos.	Com.	Ps.	Neg.	Pos. & Com.	Ps. & Neg.	Total	Per cent Negative
Less Than 0.03 Units of Antitoxin Per c.c. of Serum	15 – 39	40	1	4	11	41	15	56	26.8
	40 – 64	91	6	4	18	97	22	119	18.5
	65 – 89	9	0	1	14	9	15	24	62.5
	Total	140	7	9	43	147	52	199	26.1
0.03 Units of Antitoxin or More Per c.c. of Serum	15 – 39	5	3	16	55	8	71	79	89.9
	40 – 64	7	1	42	169	8	211	219	96.8
	65 – 89	3	0	5	51	3	56	59	95.0
	Total	15	4	63	275	19	338	357	94.6

tives by age groups does not seem to us objectionable since one would expect the rate of decline to be even greater, had we been able to use data from the more rural population of Michigan. Unless decreased exposure with age is the explanation for this phenomenon, a theory which seems improbable to us, this table suggests factors in the mechanism of diphtheria immunity which are as yet unexplained.

Further evidence that there are such factors, is suggested by the data in Table X. Here it appears that in spite of the general upward trend of antitoxin concentration with age, the percentage of persons with a negative Schick test and a low antitoxin concentration is higher in the age group above 65 than in the group below. Conversely, the Schick positive state is more likely to be associated with a high antitoxin concentration in those under 40 than in those over 40. With increasing age perhaps one or more of the following phenomena take place in a few individuals:

1. Rate of antitoxin production increases.
2. Antitoxin already produced is more quickly mobilized and concentrated at a needed place.
3. Increasing specific or nonspecific permeability of tissue to antitoxin, or to the antitoxin vehicle if there be one, assures immunity at a lower blood antitoxin concentration.
4. Some other factor together with anti-

TABLE XI

RELATIONSHIP OF ANTITOXIN CONCENTRATION TO SCHICK REACTION AFTER ANTIGENIC STIMULATION, BY AGE GROUPS

Antitoxin Concentration	Age Group	Pos.	Com.	Ps.	Neg.	Pos. & Com.	Ps. & Neg.	Total	Per cent Negative
Less Than 0.03 Units of Antitoxin Per c.c. of Serum	15 – 39	10	0	1	6	10	7	17	41.2
	40 – 64	36	2	0	12	38	12	50	24.0
	65 – 89	5	0	0	3	5	3	8	37.5
	Total	51	2	1	21	53	22	75	29.3
0.03 Units or More of Antitoxin Per c.c. of Serum	15 – 39	0	1	1	20	1	21	22	95.4
	40 – 64	1	0	1	30	1	31	32	96.8
	65 – 89	0	0	0	4	0	4	4	100.0
	Total	1	1	2	54	2	56	58	96.6

TABLE XII

CHANGE IN ANTITOXIN CONCENTRATION FOLLOWING ANTIGENIC STIMULATION OF SCHICK POSITIVE PERSONS

Shift in Antitoxin Concentration	Antigentic Stimulation														
	Schick Test			Schick Test Plus 1 Toxoid Inoculation			Schick Test Plus 2 Toxoid Inoculations			Schick Test Plus 3 Toxoid Inoculations			Total		
	No.	Mean Age	% Dist.	No.	Mean Age	% Dist.	No.	Mean Age	% Dist.	No.	Mean Age	% Dist.	No.	Mean Age	% Dist.
Increase	114	50	83.8	15	48	32.6	14	43	58.3	39	44	79.6	182	48	71.4
No Change	11	48	8.1	24	43	52.2	6	42	25.0	9	49	18.4	50	45	19.6
Decrease	11	51	8.1	7	47	15.2	4	44	16.7	1	70	2.0	23	49	9.0
Total	136	50	100.0	46	45	100.0	24	43	100.0	49	45	100.0	255	48	100.0

toxin makes antitoxin of relatively less importance in the protection of tissue, *e.g.*, decreased susceptibility to diphtheria toxin.

The coexistence of considerable antitoxin and a positive Schick test in early adult life might be explained as a corrollary of the above; namely, that in some young adults due to an absolute or relative lack of the factors above, immunity is maintained only if the antitoxin concentration is at a high level. The trend of antitoxin concentration from youth to age, as may be noted in the last column of Table XIII does not, however, bear out such a theory unless possibly the effect of a large group of persons with decreasing antitoxin is cancelled by that of a large group with increasing antitoxin.

A simple explanation of the phenomenon would be that it is due to existence of an allergic response to the diphtheria toxin molecule; in other words, that what we have called a positive Schick in the high antitoxin persons was really a sensitivity reaction to the toxic principle of diphtheria toxin.

Table XI shows data after antigenic stimulation similar to that shown in Table X before stimulation. The data are too few and irregular to justify any conclusions.

Table XII shows that in Schick positive adults, the greater the antigenic stimulus, the greater the immunologic response.

In Tables XIII and XIV are data showing the relationship of age to antitoxin concentration before and after antigenic stimulation. Table XIII shows more clearly what has been pointed out before, that with increasing age the percentage of persons with less than 0.03 unit decreases. In the first three decades tabulated, 41.7 per cent had less than 0.03 unit, while in the age period 50–79 only 30 per cent had less than 0.03 unit. How antitoxin response in Schick positive persons stimulated antigenically is related to age would be useful information, but as may be seen in Table XIV, our data are too few and irregular for any conclusion to be drawn.

Examination of Table XV shows a fairly definite increase in the percentage of Schick negatives with age, indeed a quite decidedly greater shift with age than was evidenced in the shift from below to above 0.03 unit of antitoxin.

TABLE XIII

RELATIONSHIP OF AGE TO ANTITOXIN CONCENTRATION PREVIOUS TO ANTIGENIC STIMULATION

Age Group	Serum Antitoxin Levels				Total		Total Under 0.03 Units	
	0.001	0.002 To <0.03	0.03 To <0.175	0.175 or More	No.	%	No.	%
20–29	10	3	4	18	35	6.3	13	37.1
30–39	36	7	16	38	97	17.5	43	44.3
40–49	56	9	27	66	158	28.6	65	41.1
50–59	25	16	38	58	137	24.8	41	29.9
60–69	17	8	21	36	82	14.8	25	30.5
70–79	4	9	9	22	44	8.0	13	29.5
Total	148	52	115	238	553	100.0	200	36.1
% of Total	26.7	9.5	20.8	43.0	100.0	....	....	....
Mean Age	46	54	52	50	50	....	48	....

It will be noticed that the sensitivity reactions, the pseudos and combineds, occur in a younger age group than the negatives and positives. Interestingly enough, when the positives were given antigenic stimulation and again Schick tested a similar age relationship held true: the pseudos had a lower mean age than the negatives and the combineds than the positives. Apparently sensitization took place more readily in the younger age group. Of the twelve combineds in Table XV, all of whom had been antigenically stimulated, 10 had been changed to negatives and 2 had been changed to pseudos.

Table XVI is included to complete the record. The data are too few to justify any conclusions.

We realize that as a practical measure of immunity to diphtheria the Schick test has proved its worth, and

TABLE XIV

RELATIONSHIP OF AGE TO ANTITOXIN CONCENTRATION FOLLOWING ANTIGENIC STIMULATION IN PERSONS PREVIOUSLY SCHICK POSITIVE

Age Group	Serum Antitoxin Levels				Total		Total Under 0.03 Units	
	0.001	0.002 To <0.03	0.03 To <0.175	0.175 or More	No.	%	No.	%
20–29	3	3	2	5	13	9.8	6	46.1
30–39	9	1	9	6	25	18.8	10	40.0
40–49	19	9	5	10	43	32.3	28	55.1
50–59	15	5	5	6	31	23.3	20	64.5
60–69	3	3	1	9	16	12.0	6	37.4
70–79	3	1	0	1	5	3.8	4	80.0
Total	52	22	22	37	133	100.0	74	55.6
% of Total	39.1	16.5	16.5	27.9	100.0	.....	.....	.....
Mean Age	48	48	43	48	47	.....	48	.....

TABLE XV

RELATIONSHIP OF AGE TO SCHICK REACTIONS PREVIOUS TO ANTIGENIC STIMULATION

Age Group	Kind and Size of Schick Reaction											Neg. & Pseudo		Com. & Pos.		Total	
	Neg.	Pseudo			Combined			Positive									
	11	22	33	Total	23	24	Total	12	13	14	Total	No.	%	No.	%	No.	%
20 – 29	18	5	0	5	0	1	1	5	5	1	11	23	65.7	12	34.3	35	6.4
30 – 39	47	13	1	14	2	0	2	5	24	5	34	61	62.9	36	37.1	97	17.7
40 – 49	72	21	2	23	5	1	6	9	33	14	56	95	60.5	62	39.5	157	28.5
50 – 59	85	17	0	17	3	0	3	2	25	3	30	102	75.5	33	24.5	135	24.5
60 – 69	58	8	0	8	0	0	0	1	12	3	16	66	80.5	16	19.5	82	14.9
70 – 79	34	3	0	3	0	0	0	1	5	1	7	37	84.1	7	15.9	44	8.0
Total	314	67	3	70	10	2	12	23	104	27	154	384	69.8	166	30.2	550	100.0
Mean Age	52	48	42	48	46	35	44	41	48	47	47	51	...	47	...	50	...

therefore the level of circulating antitoxin with which it is associated is not of great practical concern. But it is important immunologically. Our results, in accord with others, do not point to the existence of a level dividing all persons into the two exclusive groups of Schick positives and negatives, but our results do suggest a possible explanation for the several "Schick levels" suggested in the literature. The antitoxin concentration in the blood seems to lag behind the change from Schick positive to negative, and this lag seems to exist both in those developing a natural immunity and in those receiving artificial stimulation. One would conclude from this that Schick tests done at different intervals after either artificial or natural stimulation would

TABLE XVI

RELATIONSHIP OF AGE TO SCHICK REACTIONS FOLLOWING ANTIGENIC STIMULATION OF PERSONS PREVIOUSLY SCHICK POSITIVE

Age Group	Kind and Size of Schick Reaction								Total					
	Neg.	Pseudo	Com.	Positive					Neg. & Pseudo		Pos. & Com.		Total	
	11	22	23	12	13	14	15	Total	No.	%	No.	%	No.	%
20 – 29	9	1	0	0	2	0	0	2	10	83.3	2	16.7	12	9.2
30 – 39	15	1	1	1	4	2	1	6	16	64.0	9	36.0	25	19.0
40 – 49	20	1	1	3	12	4	1	20	21	50.0	21	50.0	42	32.0
50 – 59	13	0	2	3	10	2	1	16	13	41.9	18	58.1	31	23.7
60 – 69	13	0	0	0	2	1	0	3	13	81.2	3	18.8	16	12.3
70 – 79	1	0	0	1	1	2	0	4	1	20.0	4	80.0	5	3.8
Total	71	3	4	8	31	11	3	53	74	56.5	57	43.5	131	100.0
Mean Age	46	35	47	51	48	52	45	49	46	.....	49	.....	47	.....

be associated with different "Schick levels" of antitoxin. We feel this to be a point worthy of study.

SUMMARY

A study of the relationship between the Schick reaction, antitoxin concentration, antigenic stimulation, and age in male adults, was made in two Michigan hospitals for the insane. The following observations were made from the data:

1. Our results indicate that there is no antitoxin level in adults below which all Schick reactions are positive, and above which all are negative.

2. 0.03 unit seems a satisfactory level to use as a dividing point. At any rate we are not able to suggest a better level.

3. "False negatives" and "false positives," using these terms on the assumption that 0.03 unit or more means immunity and less than 0.03 unit susceptibility, occur in different proportions, before and after antigenic stimulation.

4. While the percentage of Schick negatives and the concentration of antitoxin increases with age, the percentage of Schick negatives increases more rapidly with age than does the percentage of antitoxin concentrations at or above 0.03 unit.

5. Our data suggest that the intensity of reaction of the Schick test is correlated to a certain degree with the antitoxin concentration. That the relationship is not more marked suggests that the mere concentration of antitoxin in the blood stream is but one factor in the relationship of antitoxin to the Schick reaction.

6. We were unable to discover the significance of such tissue reactions as intensity of erythema, necrosis, vesiculation, marked pigmentation, "two zone reactions," etc.

7. It is suggested that in order to explain why the case rate among Schick positive persons decreases with age, an immunity depending upon some factor other than circulating antitoxin must be postulated.

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Official Reporting of Childhood Type of Tuberculosis

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THE subject of the childhood type of tuberculosis has been receiving greater attention during the last two years, and tuberculin testing and X-raying of school children have become a more common procedure. To find out to what extent this change in emphasis has been reflected in official registration of the childhood type of tuberculosis cases, the National Tuberculosis Association recently instituted an inquiry. A brief questionnaire, very brief in fact, consisting of but two questions, was sent to every state health officer. These inquiries were: (1) Is the childhood type of tuberculosis reportable under the laws of your state? (2) How many cases of childhood type of tuberculosis were reported in your state in 1932?

The inquiries were made in 1933 and covered the calendar year 1932. It is quite evident from the replies that as yet there is no general effort to report childhood type of tuberculosis by physicians, and there is little attempt on the part of health officials to see that it is reported.

State laws require that tuberculosis, all forms, shall be officially reported, most of them requiring in addition that the organ or part affected shall be specified. The question at issue is whether the childhood type of tuberculosis comes within the meaning of these statutes. Is the childhood type of tuberculosis officially tuberculosis? The official attitude seems to be that of *laissez faire*, leaving to the individual physician the interpretation of the statute. If such cases are reported they are included in the official register. Some physicians to be on the safe side report such cases; most do not.

All but one state officer, Utah, replied to the questionnaire. Of the 48 states —including the District of Columbia— replying, 29 said that there was no differentiation as to childhood type of tuberculosis, that *all* cases of tuberculosis were reportable. Fourteen states replied that the childhood type of tuberculosis was not reportable, which may mean that they have made their own interpretation of the statutes in this respect. The remaining 5 states replied that it was reportable, 2— Georgia and Michigan—having made it so by regulation.

It seems highly probable, however, from the general tenor of the replies that the states which replied simply "No" to the question of reporting childhood type tuberculosis meant to infer not that it was not reportable, but that the statutes or regulations did not specifically state that it should be reported; in other words, that no differentiation was made in regard to it.

If we incline to this interpretation, which seems a plausible one, then 43 of the 48 replies showed that there was no specific law or regulation to enforce the reporting of that type of tuberculosis.

From many of the replies it seems probable that "childhood type of tuberculosis" was confused with "tuberculosis in childhood," since in

answer to the second inquiry as to the number so reported some of the replies gave the number of reported cases of tuberculosis "under 15 years of age." Of course, these are two almost entirely separate categories. Children (under 15) may have every kind of tuberculosis, pulmonary, joint, bone, gland, miliary, meningeal, and intestinal. About 35 per cent of tuberculosis deaths among children are from meningeal tuberculosis.

But the term "childhood type of tuberculosis" is distinct from all the others specified above, and is the name which has been given to the pathological effect which the initial infection with tubercle bacilli has on the lung tissue and the tracheobronchial glands. Paradoxical as it may seem, "childhood type of tuberculosis" may occasionally occur in adults, and is often seen in adult Negroes and Indians, racial groups which have not been through generations exposed to tuberculous infection.

Only 9 states replied giving the actual number of cases of "childhood type tuberculosis." These totaled a little over 2,300. There were a few more numbers reported but as they were designated as "under 15" they have not been included. The states reporting actual figures for childhood type tuberculosis are those in which we know intensive special studies for tuberculosis among children are being conducted.

So much for what is being done. What should be the policy for the future? From the public health standpoint, should the childhood type tuberculosis be made specifically reportable? I think the answer for the time being must be "No." At the present time there is no unanimity of thinking as to the prognosis of such cases.

The outcome is dependent on the resistance of the tissues and the particular environmental conditions of the individual child. To some children it is a benign condition which takes care of itself, ultimately heals, and confers a certain modicum of immunity; to other children it is the beginning of a morbid condition which needs very special care. So far as our limited figures tell the story to date, the numbers are about evenly divided between these two categories.

If we could be prescient and foresee which cases might develop into active cases of pulmonary tuberculosis, those might be made reportable, but to brand all such cases with the stamp of tuberculosis would be an injustice the effects of which might last through a generation.

Then there is the old but still potent reason which physicians always fall back on for not reporting tuberculosis cases; *viz.*, that nothing is done about it if they do report them. That is still true in many places. Then why add another category of reportable disease when facilities are meager, nonexistent, or non-operable for cases of disease already reported?

The public health policy back of all official reporting of disease, whether tuberculosis or any other communicable one, is to protect the public from further infection due to it. This protection is brought about by isolation of the case itself or by rigid aseptic technic in the home, and by examining all contacts, and immunizing them by a specific agent if known, or by giving them protective care.

How well is this carried out in the case of active pulmonary tuberculosis? Most special studies, except where very intensive contact work has been done, show that about 1 in 4 contacts is given a thorough physical examination. How can we expect the contacts of childhood type tuberculosis to receive any more thorough protective care? Of course, in childhood type tuberculosis the search in the immediate family for the active case or the carrier which has spread the infection is an impor-

tant public health measure. But the few statistical studies which have been made show that only about one-half of the cases of childhood type tuberculosis have any *known* family case to which the infection can be traced.

There is a third reason for not reporting childhood type tuberculosis. More and more the American Public Health Association *Appraisal Form* is coming into general use. Some of the ratios in it used to measure accomplishment in tuberculosis work are based on *active* cases of tuberculosis reported. For instance, 2 *new* cases reported each year to each annual death is 100 per cent attainment in reporting. The inclusion of all unearthed childhood type of tuberculosis cases in certain few areas where intensive school health examinations were carried on and the absence of such reports where no special work was carried on would make a lop-sided picture. If *every* case of chi'dhood type tuberculosis in the United States could miraculously be discovered in a single year, we might then well advocate universal reporting of such cases. But as that millenium, as the word indicates, is a thousand years in the future, it seems better for the present to create no special laws for the compulsory reporting of childhood type tuberculosis.

AN OUTFIT FOR THE RAPID COLLECTION OF BLOOD SAMPLES

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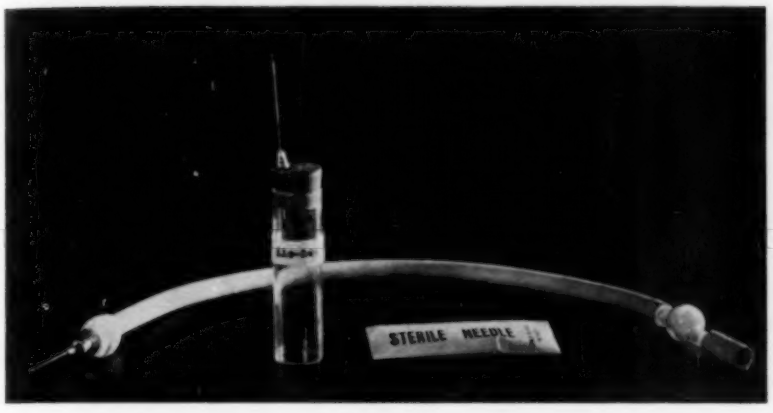
THE necessity for collecting many blood samples during a clinic has called to our attention the inefficiency of using syringes. The outfit described in this note has greatly facilitated the collection of blood samples. It is simply a modification of the larger suction apparatus frequently used for obtaining blood for convalescent serum.

The parts of the outfit illustrated below are:

1. Shell vials, 16.5 x 58 mm. (5 c.c. capacity) with # 0 red rubber stoppers cut to length of ½". (Black rubber stoppers and cork stoppers plug the needles.)
2. Two-way needles, 21 gauge, 1½" x 5/8".
3. Suction assemblage: Rubber tubing, 3/16 x 1/16" x 18" with cotton plugged mouthpiece, needle adapter, and 19 gauge, ¾" needle.

Previous to the time of the clinic, the rubber-stoppered vials and individually wrapped two-way needles have been sterilized. The vials are transported in aluminum boxes which measure 6"x12"x2" (162 vials). The needle point with the shorter shank is pushed through the rubber stopper so that the point projects just beyond the bottom of the stopper. The needle of the suction assemblage is then pushed through the stopper in like manner. With the mouthpiece in place, the free point of the two-way needle is inserted into a vein and suction is applied. After the vial has been filled, both needles are withdrawn and in a few moments a vial is ready for obtaining the next sample. Numbered adhesive labels have been found a great convenience. Such a label is readily transferable.



OUTFIT FOR COLLECTION OF BLOOD SAMPLES

The outfit has these advantages:

1. It is inexpensive, since all parts may be used repeatedly.
2. It is compact.
3. Sterilization at the clinic is unnecessary.
4. Blood may be drawn very quickly.
5. Clotted blood in syringes ceases to be a problem.
6. Blood is drawn directly into the final container.
7. The increased efficiency of the method results in a decreased confusion in the clinic and in a less concerned attitude on the part of the donor.
8. Serum may be readily separated from the clot by pouring.
9. The outfit may be conveniently used for whole blood samples and for blood culturing.
10. The particular size of vial found useful for our purpose fits the ordinary centrifuge shields and yields about 2.5 c.c. of serum.

State and Provincial Health Authorities Favor Pasteurized Milk

DR. CRUMBINE'S report indicated that 45 milk-borne epidemics had occurred during 1933 in 24 states, according to reports of state health officers, 44 of these epidemics having been traced to raw milk and one to raw cream.

Referring to undulant fever, Dr. Crumbine said:

The 4 epidemics of undulant fever reported for 1933, and none for 1932 would not seem to indicate a wide distribution of the disease or that it constituted an important health problem in relation to milk. But when we consider the 1,502 cases and 71 deaths reported by the U. S. Public Health Service occurring during the fiscal year 1933, and the other large number of unreported and unrecognized cases that probably occurred, it must be admitted that undulant fever is a health and economic problem of major importance. Infected dairy herds are widely distributed over the United States and Canada, the rate of infection running from 5 to 50 per cent or higher.

If there were additional reasons needed for universal pasteurization of milk, the increasing menace of undulant fever would provide them.—

Health News, New York State Dept. of Health, 11, 26 (June 25), 1934.

A New Mechanism of Defence Against Bacteria Through the Use of Certain Foods*

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THE bacteriology of the intestinal tract has been investigated in this laboratory for the last few years and a new viewpoint has been developed (Arnold [1]). Since this review article was published, several contributions have been made which extend our information relative to the adaptation of the bacterial flora within the lumen of the gastrointestinal tract, according to the physiological adaptation of the organism to its environment (Arnold and Kaufman,[2] Nedzel and Arnold,[3] Johnson and Arnold,[4] Nedzel, Stonecipher and Arnold,[5] Seidmon and Arnold,[6] Arnold, Korando and Ryan,[7] and Arnold [8]).

In coöperation with Dr. Walter Eddy of the Teachers College of Columbia University, the use of certain foods has been investigated to determine if they will influence the defensive mechanism of the body against orally ingested bacteria. In order to maintain quantitative relationships we have restricted our experiments to the use of desiccated fruits and vegetables.

The technic outlined by Arnold, Korando and Ryan,[7] who investigated the influence of cornstarch, sucrose, and banana powder on the acid-base equilibrium and flora of the gastrointestinal tract of rats, has been carried out in these studies. This work showed that the use of these three carbohydrate foods did not alter the acid-base equilibrium or the intestinal flora of the gastrointestinal tract. There was, however, a change in the phage susceptibility of the *B. coli* flora. Table I gives the basal diets we have used in these experiments. We have carried out only one small experiment using five rats upon the prune diet. Only a few experiments have been carried out with the tomato diet and three experiments have been completed with the apple diet. The cornstarch and banana diets have been studied for 2 years. This paper will concern itself

TABLE I

Basal Diet

Casein	18 per cent
Butter fat	3 per cent
Cod Liver Oil	2 per cent
Salt Mixture (Osborne & Mendel)	4 per cent
Carbohydrate	68 per cent

Fresh vegetables daily

1 gram dried yeast added daily

to feeding

Cornstarch — Control

Banana

* * * *

Apple

Tomato

Prune

* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

TABLE II

AVERAGE RATIOS OF GRAM-POSITIVE: GRAM-NEGATIVE BACTERIA IN GASTROINTESTINAL SEGMENTS

Diet	*Feces at Beginning of Diet*	*Stomach*	*Duodenum*	*Jej.*$_1$	*Jej.*$_2$	*Jej.*$_3$	*Ileum*	*Caecum*	*Rectum*
Cornstarch	1:3	1:1	4:3	2:1	5:2	3:1	4:1	1:3	1:3
Apple	2:5	2:1	3:1	3:1	5:2	3:1	5:2	2:5	2:3
Banana	1:2	3:1	3:1	5:1	4:1	3:1	5:2	3:5	1:2

mainly with the comparison of cornstarch and banana diets. The information we have upon apple, tomato, and prune is only of a preliminary nature. Table II shows the Gram-positive and Gram-negative ratio of bacteria, determined by direct smears from various segments of the gastrointestinal tract of the rats fed cornstarch, apple, and banana for 3 weeks period of time. Table III shows the hydrogen-ion concentration of the various segments of the gastrointestinal tract, which was carried out on the same segments as reported in Table II. Both of these tables are averages of approximately 300 rats on cornstarch, 300 on banana, and 45 rats on apple diet. It will be seen that both the bacterial flora and the acid-base equilibrium within the lumen of the intestinal tract are approximately the same with the use of these three basal diets.

B. enteritides was fed by stomach tube to rats. The dose was 2.0 c.c. We have used various periods of feeding, but for this paper we will only report upon feeding experiments which were carried out as follows: Rats were placed on the basal diet for 1 week; *B. enteritides* was then administered by stomach tube. The animals were weighed regularly and observed several times each day for diarrhea or other abnormal symptoms. A series of experiments was carried out in which two carbohydrates were used in the diet instead of the single addition as mentioned above. Thirty-four per cent banana powder and 34 per cent cornstarch were used; apple and cornstarch, and tomato and cornstarch were used in the same half and half proportions. Table IV gives the results of a series of such experiments in which diarrhea is recorded in the table. It will be noted that banana, apple, and prune diets protected the rats from diarrhea. Cornstarch and tomato diets did not seem to be protective. When banana was mixed with cornstarch in equal proportions this protective action seemed to have been lost. The tomato mixed with cornstarch did not differ from the tomato diet alone.

The average gain in weight of rats shown in Table IV has been recorded and is shown in Table V. It will be seen that the banana-fed rats have the greatest gain in weight. It does not seem that the growth factor is the one responsible for the resistance enjoyed

TABLE III

AVERAGE HYDROGEN-ION CONCENTRATION OF GASTROINTESTINAL SEGMENTS OF RATS ON VARIOUS DIETS

Diet	*Stomach*	*Duodenum*	*Jej.*$_1$	*Jej.*$_2$	*Jej.*$_3$	*Ileum*	*Caecum*	*Rectum*
Cornstarch	2.71	6.2	6.2	6.12	6.11	6.44	6.36	6.25
Apple	2.75	6.2	6.37	6.22	6.28	6.69	6.73	6.41
Banana	2.88	5.88	6.0	6.18	6.48	6.75	6.58	6.45

TABLE IV

DIARRHEA IN RATS ON VARIOUS DIETS AFTER B. ENTERITIDES FEEDING

Number Animals	*Diet*	*Time of Occurrence of Diarrhea*	*Total Days*
270	Cornstarch	4th to 10th day	6
270	Banana	No diarrhea	0
30	Apple	No diarrhea	0
30	Tomato	5th to 9th, 15th to 19th day	8
5	Prune	No diarrhea	0
15	Banana and Cornstarch	4th to 8th, 14th to 16th day	6
15	Apple and Cornstarch	4th day	1
15	Tomato and Cornstarch	4th to 8th, 14th to 16th day	6

by these animals against diarrhea after enteritides feeding.

Each cage contained 15 rats, in our experiments. Five rats were chosen and labeled, from each cage. Daily cultures of freshly obtained feces were carried out on these 5 rats from each cage. During the first 3 days after *B. enteritides* feeding, the feces were positive in most all instances. After this period of time, one or two colonies were sometimes observed, but there was no correlation between diarrhea and *B. enteritides* in the feces. The cornstarch series of rats showed positive *B. enteritides* longer than any other groups in this series.

Three weeks after the *B. enteritides* was administered, all the animals were sacrificed and organ cultures made from spleen, kidney, liver, heart's blood and the gastrointestinal tract. Considerable variation was found in different cages, even on the same diet, in so far as organ cultures were concerned. Approximately one-third of the animals were found to have *B. enteritides* in the liver; one-fourth were found to have *B. enteritides* in the spleen. The kidney, heart's blood, and the ileum were negative for *B. enteritides*.

TABLE V

Diet	*Average Weight at Beginning of Diet*	*Average Final Weight, 4 Weeks on Diet*	*Average Weight Gain per Rat*
	Grams	Grams	Grams
Cornstarch	48	134	86
Banana	48	141	93
Apple	48	100	52
Tomato	60	115	55
Prune	78	114	36
Cornstarch and Banana	67	124	57
Cornstarch and Apple	65	117	52
Cornstarch and Tomato	73	118	45

We have obtained 21 cultures of the *B. enteritides* group from various laboratories in this country and Europe. A strain sent us by Dr. Karl Meyer of the University of California has proved to be the most virulent strain we have tried in our experiments. This has been designated as the " KM " strain. This strain does not produce regular mortality in rats, even on the cornstarch diet. We have been unable to step up the virulency of this strain by animal passage. Morbidity, based upon the appearance of diarrhea, has been our test of virulency in this study.

B. enteritides isolated from various segments of the gastrointestinal tract and from the feces, as well as from the internal organs of rats fed the cornstarch and the banana diets, have been the same as the original strain, as judged from virulency, biochemical, colony formation, and antigenic tests.

A series of acute experiments were carried out in which rats were killed 1, 3, 6, 24 hours, and 1, 2, and 3 weeks

after feeding *B. enteritides*. This was carried out with rats on cornstarch and banana diets. The distribution of *B. enteritides* within the lumen of the gastrointestinal tract, and in the liver and spleen, was approximately the same in both series.

Graduated doses of *B. enteritides* were injected intraperitoneally in rats to determine the smallest amount causing death in animals. The average dose was found to be 0.25 c.c. of a 24 hour old broth culture. Table VI shows the result of a series of experiments in which we used intraperitoneal injections of the above amount of *B. enteritides*. Three strains were used: the stock "KM" strain, a strain isolated from the feces of banana-fed rats, and a strain isolated from the feces of cornstarch-fed rats. These strains had the same biochemical reactions, colony formation, and antigenic properties. Table VI shows that the banana and cornstarch-fed rats have equal susceptibility to the "KM" strain when injected intraperitoneally. The strains of *B. enteritides* isolated from the feces of the banana-fed rats and cornstarch rats had the same virulency as determined by intraperitoneal injections. In feeding experiments the strains isolated from the banana-fed rats' organs and feces had the same diarrhea producing properties when fed to cornstarch rats as the original "KM" strain. The same was true for *B. enteritides* isolated from feces of cornstarch-fed rats.

TABLE VI

Diet	*Strain B. enteritides*	*Result*
Banana	"KM" stock	Died 48 hours
Banana	Banana feces strains	Died 7–10 days
Banana	Cornstarch feces strains	Died 7–10 days
Cornstarch	"KM" stock	Died 48 hours
Cornstarch	Banana feces strains	Died 7–10 days
Cornstarch	Cornstarch feces strains	Died 7–10 days

Three weeks after *B. enteritides* intragastric administration to rats on banana diet, intraperitoneal injection of the minimal lethal does of the same antigen caused death on the 3rd and 4th day. The same experiment carried out with cornstarch-fed, enteritides-injected rats produced death on the 7th and 8th day. This would indicate some protection in the cornstarch-fed rats as a result of their experience with this antigen. These results are not conclusive but may indicate some protection.

Heat stable Salmonella toxins and ox-bile (Arnold [1]) were given by mouth to the banana-fed rats in order to increase their susceptibility to *B. enteritides*. These gastrointestinal irritants did not seem to disturb the animals inasmuch as no diarrhea developed and the organ cultures were the same as the control series.

TABLE VII

FIFTY MICE ON EACH DIET FOR 1 WEEK, THEN FED B. ENTERITIDES AND OBSERVED FOR 4 WEEKS

Diet	*Per Cent Mortality*
General stock	96.0
Cornstarch	42.0
Banana	6.0

The first of the series of experiments upon mice will be included in this paper. Our stock diet for mice consists of equal amounts of "puppy meal" and cracked corn. This has been used for a number of years in this institution for our stock mouse colony. Table VII gives the results of the use of 150 mice, 50 for each of the three diets indicated. After 1 week on these respective diets, the animals were given *B. enteritides* by stomach tube and observed for 4 weeks. The mortality of those on the stock diet was 96 per cent, cornstarch diet 42 per cent, and the banana diet 6 per cent. These experiments are being continued. This table is included to indi-

cate that mice may be better animals for assay of these factors than rats.

DISCUSSION

Standard basal diets, with variations in the carbohydrate components, were fed from the standpoint of calories, protein, inorganic salts, and vitamins. The diet promoted growth, produced good pelts, and the behavior of the animals was normal as far as we could determine. The differences in the results obtained, after the *B. enteritides* feeding, was first thought to be due to an interference with the self-disinfecting mechanism (Arnold [1]). But, inasmuch as the intra-intestinal distribution was the same in both series of animals, this did not explain the absence of diarrhea in the banana-fed animals. We next thought of decreased permeability of the intestinal wall as a factor. But, inasmuch as the organ cultures were approximately the same in both series of animals, this mechanism again did not explain the differences in these experiments. When banana powder is used for the carbohydrate source of our basal diet instead of cornstarch, rats have the power of physiologically adapting themselves to *B. enteritides* administered by mouth. The intra-enteric and organ distribution of *B. enteritides* is the same in both banana- and cornstarch-fed series. No resistance is enjoyed by the banana-fed rats 3 to 6 weeks after *B. enteritides* injection, although one-third to one-fourth of these animals are liver and spleen carriers of *B. enteritides*. Wasserman and Citron [10] explain the increased protection enjoyed after local vaccination as due to a re-tuning of the endothelial system and a consequent increase in physiological response by destroying invading bacteria *in situ*. Inasmuch as the bacteria in the organs are the same in both series, this explanation would not hold in our experiments.

Gulbrandsen [9] discussed before the Laboratory Section of this meeting, a change of bacteria from viable to non-viable forms within the stomach and duodenum. He showed that these same non-viable forms could be rendered viable again under certain conditions. In other words, the active acid-secreting stomach has more of a bacteriostatic than a bactericidal function. There is a complicated biological change going on within the lumen of the intestinal tract. Bacteria are rendered non-viable within the acid-secreting stomach and are revived and made viable in the lower segment of the small intestine and in the large intestine. In our experiments so far, when these non-viable forms penetrate the wall of the intestinal tract and are cultured from the internal organs, they show certain biochemical and antigenic alterations from the original strain. We are now investigating this aspect of the protective action of foods against pathogenic enteric bacteria, in laboratory animals.

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Elements Involved in Determining the Qualifications of Health Officers*

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IN considering the factors, a term I prefer to elements, with which we are faced in any attempt to determine even the basic qualifications of health officers, we must remember that public health work and preventive medicine draw upon the whole sum of human knowledge; that measures used in the conservation of life and health rest upon a knowledge of the arts and natural sciences as well as upon medical science. Moreover, we must have in mind personal qualifications as the complement to professional ability, and that, lacking either personal or professional fitness, an individual is unlikely to succeed in the execution of an effective public health program.

It requires no close study to bring out the endless complexities that present themselves for consideration when an attempt is made to formulate standards applicable to single groups or classes of health officials. Imagine how much more complex the question becomes when the elements of population units to be served and governmental jurisdictions are added. Can the same set of standards be required for the health officer of a city of 50,000 as for a city of 5,000,000? Will similar requirements be made for federal and state governments as for a rural county of 20,000 population?

One may well approach the whole question in fear and trembling, and one may be very sure that in the end he must compromise the ideal with the practical for, if he places his theoretical ideal so high as to be unattainable, he will have defeated not only the immediate but the ultimate objective. In this connection, I recall the experience last spring of our Committee on the Qualifications of Local Health Officers of the State and Territorial Health Officers' Conference. On that committee are men of the widest experience in public health training in both technical and administrative work, yet reference to the minutes shows the first action of the committee to have been limitation of consideration to systematic training in professional qualifications, thus immediately excluding consideration of all personal qualifications. While the next formal action was a resolution favoring the development of professional standards for health officers as a necessary step in safeguarding the public health, the committee as its third action still further limited the field for consideration by confining discussion to the qualifications of *local* health officers in charge of counties, districts, or other communities having a population of less than 50,000. Within these quite narrow limits, the committee then proceeded to formulate the following qualifications as its idea of the basis upon which, in its opinion, health officers should be chosen:

* Read at a Special Session on Professional Education of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

1. That the candidate hold a degree of Doctor of Medicine from a reputable medical school, and be eligible to take the examination for a license to practise medicine in the state. A license, however, was not considered necessary except where required by law in individual states.

It is considered highly desirable that any candidate for appointment shall have had at least 1 year of clinical experience, including 3 months in pediatrics and 3 months in infectious diseases, gained preferably in a hospital of acceptable standards.

2. That the candidate be not more than 35 years of age when first specializing in public health.

3. That where practicable the candidate be required to have had special training in the theory and practice of public health as follows:

A. He should have had not less than 1 year in residence at a recognized university school of public health.

B. In addition, he should have had not less than 6 weeks of field experience under proper supervision in a local health organization.

4. Pending the development of a reserve of personnel with qualifications specified in Item 3, appointing officers at their discretion may accept (a) carefully selected personnel who have had, or who will spend, from 3 to 6 months in a local health organization which is in position to supervise a course of field training, and (b) personnel who have taken in a university a graduate course of instruction in public health of not less than 3 months' duration, 6 weeks of which shall be spent in a well organized local health department which is in position to give supervision.

5. That all persons holding the position of health officer at the time these standards are adopted by a state be required to meet the requirements specified in Item 4-B.

I believed then and I believe now that this method of approach is sound, for it seems to me the only way in which we may solve this question that has so long vexed our minds is by determining its elements and considering each element in its relation to the whole. We may, I believe, dismiss the question of personal qualifications by requiring the highest standard of character and the ability to work with, as well as for, the people to be served. Except in posts of larger administrative responsibility where ministerial duties still further complicate the picture, these simple requirements should suffice.

The development of professional standards of qualification is, however, not quite so easy of solution. Here we must consider not only the varying size of population units to be served and other factors to which reference has been made, but also the varying per capita wealth that governs the capacity to provide public health service. I do not mean that the compromise of the theoretical ideal with the practical should be destructive of high standards but on the contrary that it should be a constantly moving standard, always approaching the ideal but never stifling growth and development of sound public health organization.

In this brief introduction to the problem concerned with factors involved in determining the qualifications of health officers, I have not attempted to point out nor to catalogue separately all of the many factors we shall have to consider. I have, however, tried to emphasize the need for a sane and practical approach in dealing with the question of securing more effective service through sound standards of qualification. That satisfactory results may be attained is supported by the experience of the Province of Quebec where almost all full-time health officers—even health officers serving the smaller rural jurisdictions—have had "not less than 1 year in residence at a recognized school of public health."

An Epidemiological and Clinical Study of an Influenza Epidemic in a College Community*

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SINCE the pandemic of influenza in 1918–1920, sporadic cases have appeared constantly, epidemics have appeared focally and generally with almost cyclic regularity. Dublin reports in a study of mortality rates that a regular increase in deaths reported from influenza has occurred at approximately 3 year intervals since the war. An increase in influenza morbidity and mortality had been predicted for the year 1932–1933.

Influenza appeared in epidemic proportions during the fall of 1932 among college students at Stanford University. Although the attack rate was relatively low (7.2 per cent), the course of the disease fairly mild, and complications without serious consequence, there were certain interesting features of the epidemic which justify careful study and report. This was one of the first communities in continental United States to report on the appearance of influenza in epidemic proportions in the fall of 1932. It is frequently difficult to secure accurate records on influenza outbreaks in given population groups because of lack in uniformity of diagnoses and report on cases. It is much easier to secure accurate reports on epidemic outbreaks in a college group. Central health supervision, uniform records and close contact with students make possible more comprehensive reports on epidemics. When students at Stanford University become ill they report either to their own physicians, directly to the hospital located on the campus, or to staff physicians in the offices of the Student Health Services. Students who are not seen in the Health Services at the onset of acute illnesses usually report there after recovery for the purpose of petitioning for leaves of absence for the period during which they were unable to attend classes. It is, therefore, possible to make contact with most students who have been absent because of illness, to establish with some precision the diagnosis of the disease and its complications, and to determine disability periods. The majority of students who became ill during this epidemic reported early to the Health Service where careful histories were recorded and where positive diagnoses of influenza were based on certain definite criteria acceptable to all staff physicians. A number of cases have been omitted from this report which ran mild or atypical courses. The report does not therefore represent the total number of probable cases, but only the total number of cases in which diagnoses could be satisfactorily established.

* From the Men Students' Health Service in the School of Hygiene and Physical Education in Collaboration with Dr. Walter H. Brown of the University Health Service and Miss Yvonne Fay, Public Health Nurse.

EPIDEMIOLOGY

Several scattered cases were reported during October. Early in November there was a sudden increase in cases reported by date of onset so that between November 6 and November 14 the incidence had reached the peak. From that date there was a rapid decline to November 19 and a second rise in incidence to a similar peak on November 21. Following this date there occurred a rapid subsidence of the epidemic. Chart I represents the incidence by date of onset beginning with the first case reported on October 6 and extending to December 6 when the study was terminated. The occurrence of the second high point in incidence cannot be explained except that on November 19 there was a general migration of students from the campus to Berkeley because of a football game. The second peak in incidence occurred 2 days after this game. The rapid increase in incidence and the more rapid decline is interesting. No special control measures were instituted except for early segregation of cases. Had such measures been attempted the incline might have been less rapid, the decline might have been more gradual and administrative management would have been easier.

It has been difficult to determine with any accuracy either the spread through contacts or the incubation periods because of the close association between students in classrooms, dormitories, gymnasia, common eating halls, and in university gatherings. A study was made of contacts in several of the men's dormitories, but very little information was gained. It is nevertheless surprising to learn that room-mates of students who became ill rarely contracted the disease. In a study of incidence in a series of 89 cases who had room-mates, it was found that only 9 occupants of the same room became ill. In 7 of this number the room-mate came down with the disease between 48 and 72 hours after the other occupant of the room had become ill. This occurred in each case in spite of the fact that the first victim had been early removed from the room. This combined with the fact that the incidence rate showed definite increases within 48 to 72 hours after general university gatherings suggests that the incubation period is fairly short.

CHART I—INFLUENZA EPIDEMIC, AUTUMN, 1932
INCIDENCE BY DATE OF ONSET

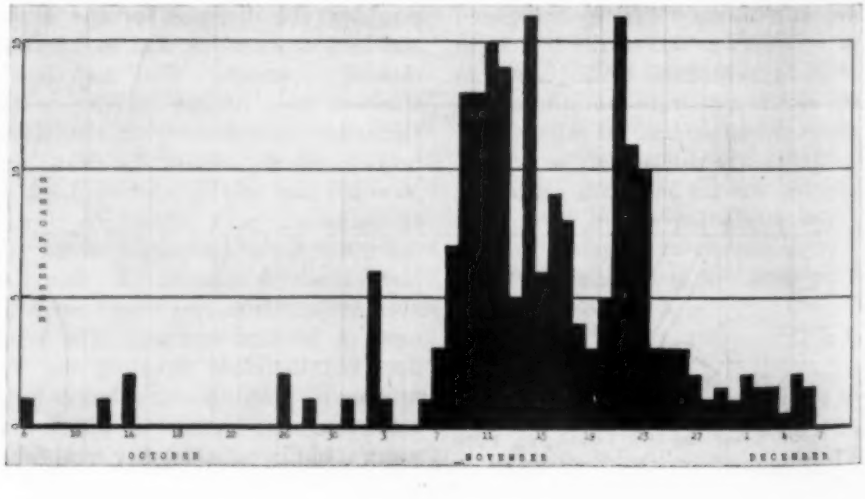

TABLE I

STANFORD UNIVERSITY
SCHOOL OF HYGIENE AND PHYSICAL EDUCATION
MEN STUDENTS' HEALTH SERVICE
INFLUENZA EPIDEMIC—AUTUMN 1932
SPECIFIC MORBIDITY RATES IN THE VARIOUS LIVING GROUPS

	Encina	Branner	Toyon	Sequoia	Union	Roble	Fraternities	Sororities	Campus	Palo Alto	Other
Population	507	143	170	146	110	203	652	236	81	307	133
No. of cases	57	9	18	7	6	19	49	15	3	15	3
Attack Rates	11.2%	6.2%	10.5%	4.7%	5.4%	9.3%	7.5%	6.3%	3.7%	4.8%	2.2%

A study of incidence by age is limited because there is little variation in the age group studied. No figures are available to show the average age of all students in college, but statistics compiled by the university giving the average age of college matriculants entering during the first year, first and second year, third and fourth year, and in graduate standing give some light on the subject. The largest number of cases occurred between ages 20 and 21, but the disease was more frequent in students under 20 than over 21. Although the age spread is too small to be of particular moment, still it is significant that students of average graduate age were relatively free from attack. Many upper class and graduate students were on the campus during the epidemic of 1929. This leads one to suspect that the younger age groups may have been more susceptible. It is interesting to note that the first reported case was in a graduate student aged 22 and that no cases were reported in students over 25 years of age while the average age of graduate matriculants is 29 years and graduate students make up roughly one-third of the student population. In general, the earliest cases reported were first year students while the disease later spread to upper age groups.

The 200 cases here reported include 41 women students. Since there are only 500 women students in the university, no comparison in attack rates by age is possible, but if it may be assumed that the total group includes similar numbers of reported cases and substantiated diagnoses in men and women students, the incidence was slightly higher in women students than in men students. The attack rate was 9 per cent for women as compared with 7 per cent for men. The incidence was somewhat higher in the lower age groups in women than in men, 46 per cent of cases in women being in the first year class. The highest incidence in women occurred between 18 and 19, as compared with 20 and 21 for the men.

Studies on the geographical distribution of the influenza cases revealed certain interesting facts. Most of the students attending the university live on the campus, either in dormitories or fraternities or in private rooms. A smaller number live in town or commute from nearby points. The relative morbidity rates in these various living groups is shown in Table I. This shows the number of students making

up each group, the number of influenza cases which occurred in each group and the attack rates by groups. It was found that higher morbidity rates occurred in the two dormitories occupied chiefly by first year students. There is no explanation for the high morbidity rate in Toyon Hall which is occupied by Sophomores, Juniors and Seniors, but most of the victims in this hall were sophomores whose average age was found to be slightly less than 20 years. No relation between general sanitary conditions of the living groups and morbidity rate could be determined. The relatively low attack rates in off-campus groups does not give quite a true picture of the situation since many of these students became ill after the campus epidemic had subsided and after the study had been terminated. The attack rate in this epidemic has been unusually low—the highest in any one living group being 11.2 per cent, the lowest, 2.2 per cent. The attack rate has been much higher in reports from other communities during this epidemic.

DISABILITY RATES

A relatively short period of disability characterized the epidemic. Disability is here defined as the number of days a student was forced by virtue of his illness to absent himself from his class-work. It does not include the rather long period of convalescence during which time the student was able to carry on at least part of his work. Nor does it include disability caused by complications. The epidemic produced a total of 882 student disability days during the 66 days included in the study. This means that an average of 13 students were disabled on each day of the study. The average period of disability was from 3 to 5 days and 91 per cent of the group were disabled from 2 to 6 days. The 3 cases which were disabled 11 and 12 days were patients who had recovered from the first attack but who had relapses (without complications) before they were able to return to work. The total disability time was considerably prolonged through the superimposition of complications. Several students were forced to leave school for the remainder of the quarter because of complications, failure to recover from weakness, or because of delinquency in class work. Many were partially disabled through persistent complications, many suffered from common colds following influenza. While the actual disability time of influenza has been short, the total and partial disability resulting from complications and sequelae have brought heavy economic and health liabilities to its victims.

DIAGNOSIS

The clinical picture of influenza has been clearly described by various authors and the diagnosis should not be particularly difficult in the known presence of an epidemic unless the attack and course are unusually mild or unless the symptom complex is early confused with superimposed complications. It is nevertheless surprising how frequently the diagnosis is made on what would appear to be insufficient clinical evidence. There is a tendency on the part of physicians to over-diagnose the disease. Many cases of influenza would probably be diagnosed as common colds in the absence of an epidemic. The increase in number of acute upper respiratory infections which occurs coincidentally with influenza tends further to confuse the diagnosis and to decrease the accuracy of reports. A careful study of onset symptoms in order of their appearance, frequency of occurrence and severity and strict observance of the time of appearance and relative severity of localizing symptoms would reduce confusion in diagnosis and determine more accurately the chronology of complications. The

diagnosis of influenza should not be safely made in the absence of constitutional symptoms or when symptoms referable to the upper respiratory tract predominate from the onset.

An unusual opportunity has been presented in this study to reduce confusion in diagnosis, to establish with more than usual accuracy and with considerable uniformity the onset symptoms in order of frequency and severity and to observe clearly the appearance of complicating symptoms. Every effort has been made in studying this group to establish accurate diagnoses and our efforts have been facilitated by several factors which cannot always be secured in an epidemic study in less well controlled groups of the population. Most of the cases reported early so that accurate history of onset was made possible. The accuracy of histories was increased by the fact that patients were intelligent and coöperative, and because physicians were uniform in their methods of approach. Most of the cases were under observation in the same hospital where progress was followed daily by a public health nurse. Cases were also watched uniformly through the period of convalescence. Positive diagnosis has been based upon the presence of a general constitutional reaction coming on suddenly or within 12 to 24 hours of the first complaint of not feeling well. This reaction usually included fever, prostration, headache, malaise, backache, and chilly sensations. It was commonly accompanied by localizing symptoms such as dry cough, sore throat, dry or obstructed nose, soreness of the eyes, nausea, and occasionally by vomiting and diarrhea. The finding of normal or lower than normal white blood counts with lowered polymorphonuclear elements or relative lymphocytosis further confirmed the diagnosis. The finding of leukopenia was found to be reduced in value because it is early changed by the superimposition of complications.

Occasionally the prostration was mild, fever was moderate, and there was little headache or general malaise; yet there were also no predominant upper respiratory symptoms, so that in the presence of an epidemic one would be forced to consider the diagnosis as

TABLE II

ONSET SYMPTOMS IN ORDER OF FREQUENCY AND SEVERITY, INFLUENZA EPIDEMIC, STANFORD UNIVERSITY, AUTUMN, 1932

Symptom *	—	+	++	+++	++++	+++++
Fever *	3	19	66	47	43	22
Prostration	8	49	69	70	4	
Headache	30	64	89	15	2	
Malaise	57	42	78	22	1	
Cough	93	85	20	2		
Backache	121	23	50	6		
Sore throat	124	75	1			
Chilly sensations	155	20	25			
Nausea	167	28	5			
Nose (Dry or Obstr.)	171	27	2			
Soreness of Eyes	172	28				
Diarrhea	177	14	9			
Vomiting	192	5	3			

* Symptom Code:
Absent = —
Mild = +
Moderate = ++
Severe = +++
Very severe = ++++

* Fever coded as follows:
Below 99° F. = —
99.1–100 = +
100.1–101 = ++
101.1–102 = +++
102.1–103 = ++++
103.1–104 = +++++

influenza. These cases were few. More frequently confusion in diagnosis resulted from early appearance of upper respiratory symptoms superimposed upon mild constitutional reactions which might or might not have justified a primary diagnosis of influenza. Unless careful history revealed the definite constitutional reactions of influenza, such cases were diagnosed as upper respiratory disease. It is probable that certain cases of mild influenza with early upper respiratory complications have not therefore been included in the series studied. The study has been limited to 200 cases in which the data secured led to unchallenged diagnosis. Since the epidemic began soon after the opening of college and had practically subsided by December 1, only those cases occurring between October 6 and December 6 are included in the report.

Some cases when first seen were already complaining chiefly of sinusitis, bronchitis, or another upper respiratory condition; but most cases were seen early when the general constitutional reactions were at or near the peak. A careful study was made in the 200 cases forming this series to determine the onset symptoms with reference both to predominant complaint and relative severity. In order to secure more uniformity in reporting complaints in accordance with their importance both as seen by the patient and as observed by the physician we have made use of a simple code which is familiar to all examining physicians in the Health Service and which is used extensively in evaluating findings. Although such a code is valuable only to those who use it uniformly it gives simply and concisely a quantitative estimation of the severity and relative importance of symptoms.

Table II shows the chief symptoms at onset with frequency of occurrence in 200 cases and the relative severity as observed by the patient and by the examiner. Quantitative estimation of severity is outlined in the key.

It will be observed that fever was the most common and tended to be the most acute symptom. It was present at onset in all but 3 cases. The onset temperature was most commonly between 100.1° and 101° F. but was more often higher than lower, in 90 cases being between 101.1° and 103°. Prostration was present in all but 8 cases. It was more often severe than mild, and in 4 cases was measured in almost complete collapse. The extent of prostration was not definitely related to the degree of fever, often those with moderate fever were very much prostrated. Headache was the next most common complaint. It was present in 170 cases and was more often slight or moderate than severe. It was usually frontal, but occasionally was coronal and more rarely (frequently associated with nausea) it was occipital. General muscle-joint aching or malaise was present in all but 57 cases. It was also described more frequently as mild than severe, usually moderate. Cough was present at the onset in about half the cases. It became more frequently a complaint as the epidemic advanced. It was almost always dry, hacking and irritative without expectoration. It was often associated with a feeling of tightness in the upper chest and the act of coughing was rather painful. Examination of the chest at this time revealed either no ausculatory changes or only harsh breath sounds heard over the roots or lung bases. Evidence of bronchial exudate was rare at this time. A symptom which occurred less severely and which was complained of less frequently was backache. It was offered as a complaint by 79 patients. "Sore throat" was one of the onset complaints of 78 patients. It was not an outstanding onset symptom, and examination revealed nothing beyond a generalized injection of the mucous membranes

of the fauces which usually extended down the posterior pharyngeal wall. No exudate was present. Forty-five patients complained of chills, or chilly sensations at the onset. Careful questioning failed to reveal that these were characteristic chills, but rather that the extremities felt cold and that the patient felt generally "chilly."

Only 29 patients complained of nasal symptoms. The usual complaint was that the nose felt dry and irritated or obstructed. Excess secretion was not present at this time. A number of patients complained of soreness of the eyes. Others who did not offer this as a complaint were observed to shield their eyes from the light. Slight injections of the conjunctivae were common findings in these cases. Gastrointestinal symptoms were fairly common. The usual onset symptoms in several cases were preceded 12 to 24 hours by an acute enteritis with nausea, vomiting and diarrhea, usually without cramps and without fever. The condition presented a picture of so-called acute food poisoning. About the time this condition began to improve, acute prostration, fever, malaise, etc., supervened. In other cases the intestinal symptoms coincided with onset of fever, prostration, etc. Nausea was the most frequent gastrointestinal symptom, but this is frequently associated with sudden high fever and so is found out of order in the list of gastrointestinal symptoms. In this connection it is interesting to note that the California Public Health Reports showed an increase in cases of food poisoning coincidental with the increase in cases of influenza at that time.

A review of onset symptoms reveals the fact that onset is usually associated with a general constitutional reaction —fever, prostration, headache and malaise, in that order of frequency and severity; that the most common localizing symptom was cough, which was more frequently a complaint during the later period of the epidemic, and was always an early complaint in those who later developed bronchitis or pneumonia; that at onset it was dry, hacking and often painful. Sore throat, though a common localizing onset symptom was found on examination to be due to a general pharyngeal injection. Gastrointestinal symptoms were rather common onset or even precursory symptoms which deserve more thorough study since they often tend to confuse the early picture.

COMPLICATIONS

In 81 cases included in this study the acute constitutional reaction and localizing symptoms were not followed by findings leading to the diagnosis of complicating disease. Although this number is relatively small the fact that uncomplicated cases occur should lessen the confusion in diagnosis and make easier the description of influenza as a clinical syndrome. In these cases the course was rapid, duration was short, and the convalescent period was brief, so that one is led to believe that influenza is not a serious disease *per se*, but that morbidity and mortality are increased because of complications.

The most common complications in this epidemic have been acute bronchitis and acute sinusitis or a combination of the two. Such diagnoses were made following influenzal onset in 43 cases. Such cases have been largely responsible for the prolonged disability period and slow convalescence. Acute tonsillitis occurred as a complication in 6 cases, and acute otitis media appeared in 5 cases. One case of acute cystitis and one case of focal arthritis occurred either coincidentally or as complications. In 2 cases the onset symptoms were shortly followed by the appearance of dry pleurisy, one of which developed pneumonia. Broncho-pneumonia is a common complication in epidemic in-

fluenza. It occurred in 11 cases in this series, was fairly mild in all but 3 patients who became critically ill. It was a more common complication of the later period of the epidemic, as was acute bronchitis, and the 3 critical cases of pneumonia, all became ill from influenza during the last week of the epidemic study.

SEQUELAE

Relapse occurred in 2 cases with a primary disability period and in 2 after return to classes. A large number of patients after recovery from influenza suffered from common colds. Among other sequelae must be mentioned the marked lowering in the threshold to fatigue, residual tachycardia, night sweats, anorexia and general muscular weakness. Three students were forced to discontinue their school work because of marked weakness of extra-ocular muscles. Six were unable to finish the school quarter because of the persistence of marked general weakness.

SUMMARY

The appearance of influenza among college students at Stanford University in the fall of 1932 presented an opportunity for studying intimately the disease in its epidemic form. Conditions were unusually favorable for such a study since the health supervision in the college community is centrally controlled, most of the cases have reported early, have remained under observation during the course of the disease and during convalescence, and incidence, geographic distribution, and disability were easily determined. It was possible to establish diagnoses with greater accuracy than is often obtained in an epidemic study, since certain definite symptomatic criteria have been set up for the purpose and observed uniformly by members of the medical staff. Because of careful histories and the reporting of symptoms by time of appearance, frequency and severity, it was possible to contribute further to those criteria upon which the diagnosis of influenza should be founded. Finally, it was possible by the same methods to identify the complications in order of frequency and importance. Although a slightly larger number of cases was reported, 200 cases were selected for the study, the selection being based on accurate reports, unchallenged diagnoses, and complete follow-up study. The epidemic reached its peak very rapidly, then after a short period in which the number of reported cases diminished there appeared a second peak. This was followed by a rapid and final decline. The height of the epidemic occurred between November 6 and 27. Very few new cases were reported after that time. The importance of spread through contact could not be determined with accuracy, but there were surprisingly few instances where room-mates of victims were affected, and there appeared to be some relation between university gatherings and increase in reported cases. From the latter observation and the study of the occasional room-mates who were affected, it appears that the incubation period is short, probably usually 48–72 hours.

The attack rates were definitely higher in the lower age groups. The incidence was highest in occupants of first year dormitories and in sophomores living in other dormitories. The incidence in students of average age of graduate standing was surprisingly low. The incidence was slightly higher and the disability period was slightly longer in women students than in men students. The total disability caused by the disease was rather low and the average disability period per student was relatively short—in 91 per cent of the group the period of disability was between 3 and 5 days. Confusion in

diagnosis occurred chiefly in the occasional mild cases and when complications occurred early in the course of the disease. A careful study of symptoms at onset in regard to time of appearance, frequency of occurrence and relative severity has assisted greatly in reducing this confusion. Complications were very common and the total and partial disability resulting from complications and sequellae was high, producing much greater economic loss and impaired health than was caused by influenza *per se*.

Maternity Benefits from Public Sources—Sweden

MATERNITY aid from public sources was first introduced by way of experiment in four provinces of Sweden during 1931, but within the next two years it was gradually extended to the entire country. This aid is given to women members of social-insurance funds and to noninsured women. In the case of insured women the insurance funds are required to pay maternity benefits, for which they are later reimbursed by the national treasury. Formerly the payment of maternity benefits was optional. The benefits amount now to 2 kronas daily, instead of 1 krona (par value about 27 cents) as formerly, and are paid for a period of 30 to 56 days, instead of 14 to 42 days. In addition free attendance by a midwife or hospital care is now provided.

The new regulations governing the sickness insurance funds also permit a nonemployed woman to become a member for sickness insurance only. At the time of childbirth such a woman is entitled to free attendance by a midwife and to maternity benefit of 2 kronas daily for at least 30 days. Since the premiums for this kind of insurance amount to less than a half krona a month, a woman of even small means may obtain the above benefits.

The most significant feature of this new system of maternity aid is, according to the students of social welfare in Sweden, the provision of maternity aid to noninsured women, whose income is below a certain amount. It has been calculated that out of the 93,000 annual cases of childbirth in Sweden 70,000 belong in this category. The aid is 1 krona a day paid for a minimum of 30 days, and for 56 days in the cases of women employed in industries protected by the labor code. No free attendance by a midwife is provided to noninsured women.

Application for maternity benefits must be made at least 60 days before the expected birth of the child. The purpose of this requirement is to enable the disbursing organization to give the woman prenatal advice and, if necessary, make arrangements for her care during pregnancy and confinement and for the care of the child. Plans are being made for coöperation with child health centers and similar organizations.—*Tidskrift för Barnavord och Ungdomsskydd*, Stockholm, No. 1, 1934.

Standard Blood Agar Plate in the Control of Scarlet Fever*

Experience of a Rural Health Unit

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IN 1929 blood agar plates were introduced by Dr. C. D. Barrett in the work of the Lorain County Health Department in the control of scarlet fever. This study reviews our experience with these plates from January 1, 1931, through August, 1933. In this time we had 339 cases of scarlet fever, 751 suspects, and 16 cases diagnosed as septic sore throat. How we used blood agar plates and our conclusions as to their usefulness is told in this paper.

Ours is a district health department in northern Ohio serving a county of 40,000 people scattered over 10 villages and 20 townships in an area of 476 square miles. It is a department of moderate size, with a full-time health officer, 3 nurses, a sanitary officer, a laboratory man, and a clerk. The laboratory man is also the milk inspector. Our laboratory is a small room, 9′ x 14′, but we make the ordinary bacteriological determinations, except for Wassermanns.

When a case of scarlet fever is first seen, a throat culture is taken routinely, from both tonsillar regions if possible. In the laboratory sterile normal saline is poured into the tube, covering the swab. The tube is shaken and set aside. To a tube of ordinary melted agar cooled to 40°–42°C. a loop of the saline suspension is added, then 0.5 c.c. of beef blood (preserved with citrate in the refrigerator). The whole is rolled, then poured into a plate, and incubated. After approximately 18 and 42 hours the plate is examined for the characteristic colonies of the hemolytic streptococcus, beta type. Release culture were taken 18 days after the onset. If positive, still other cultures were taken until negative.

We have had no epidemics of scarlet fever, but have shared the general increase which most of Ohio has experienced. The table deals with 103 cases in 1931, 151 in 1932, and 85 in the first 9 months of 1933. This is an annual morbidity rate of 306 per 100,000. Cases have been quarantined on the diagnosis of practising physicians or of the health commissioner.

TABLE I

Early culture (when first seen) positive	165
First culture negative, a later culture positive	38
First culture negative, later cultures negative	53
First culture negative, no release culture shown	15
No early culture taken, later culture positive	17
No early culture taken, later culture negative	27
No cultures recorded at all	24
Total cases cultured	315

* Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

Of the 339 positive cases of scarlet fever dealt with, Table I summarizes the results of cultures:

Of the 271 cases with a culture within a week of onset, 165, or 60.9 per cent, gave a positive culture. Of the 106 negative at first, 38 were later positive. Special effort to reculture early negatives was seldom possible, or more positives would probably have been obtained. Of the 44 who had no early culture, 17 were later positive. Thus of the 315, 220, or 70.2 per cent, were positive at some time.

We made some study of the symptoms accompanying scarlet fever. In 188 cases in which report was made, peeling occurred in 161, or 83.0 per cent. Of the cases whose cultures were always negative, 34 peeled, 9 did not. Of those who peeled 104 (66.7 per cent) had positive cultures at some time, 52 were negative, and 6 had no cultures recorded. In 168 cases there is a definite statement on the question of vomiting. This occurred in 111 cases, or 66.1 per cent.

Most of our cases of scarlet fever were quarantined without reference to the culture, but frequently in doubtful cases we waited for a positive culture and considered it so much additional evidence. It aided when the rash was very faint, or hard to distinguish from other rashes.

The culture was uniformly employed when the question of release arose. Ohio now quarantines at least 21 days for scarlet fever. At 18 days after the onset we took a throat culture. If negative, the patient was discharged at 21 days. If positive, the culture was repeated until negative. Usually the throat cleared up rapidly. A continued positive culture was almost invariably associated with enlarged tonsils or enlarged cervical glands. An otitis media would give a positive culture as long as the discharge continued, long after the throat was negative. One high school boy developed a maxillary sinusitis following scarlet fever and a supraorbital abscess. Cultures from the throat became negative, but those from the nose and the incised abscess cavity continued positive until the supraorbital wound healed.

We used the cultures quite widely in examining suspects. If scarlet fever appeared in a class in school, the other pupils in the room were examined. Those with sore throats or those arousing suspicion in other ways were cultured. Sometimes a positive culture, added to a suspicious tongue or an almost faded rash, made a diagnosis possible and the child was quarantined. In other cases while the evidence was not conclusive enough to call it definitely scarlet fever, the child was excluded from school as a probable carrier until his throat became clear. We made no study of the virulence of organisms found in the throats of such carriers.

In all cultures were made in 751 suspected cases, aside from those quarantined. Of these 181, or 24.1 per cent were positive. Some of those negative might have proved positive on reculturing, but by imposing some degree of restraint on those found positive, we lessened considerably the number of scarlet fever organisms in circulation. It is noteworthy that of the suspects 40 showed some degree of peeling. Of those peeling 15, or 37.5 per cent, had positive throat cultures. Quite possibly we should have quarantined them. By way of comparison, 46.3 per cent of the quarantined cases who peeled had one or more positive release cultures.

Cultures in suspicious cases encountered late in the disease were especially valuable in differential diagnosis. A child with a running ear and a history of a cold and a rash some weeks previously might have had measles or scarlet fever. If the culture showed hemolytic streptococci of the

beta type, we were inclined to consider it scarlet and isolate.

A boy with an infected finger developed an axillary abscess. Later a general punctate eruption appeared. The abscess yielded *Streptococcus hemolyticus,* beta type. The throat was never sore. Here we had scarlet fever resulting from an invasion of the body by way of the finger instead of the usual avenue, the throat.

In 1930 a farmer had a blistered finger, which developed a severe infection of the finger. Culture of the incision showed *Streptococcus hemolyticus* beta. In 3 days scarlet fever appeared in 1 child, who died. Two other children also had scarlet fever.

A baby developed influenza, then empyema, and later a general punctate eruption. The throat never showed hemolytic streptococci, the pleural cavity did so consistently until it healed. The child peeled.

A boy treated in a hospital for extensive burns on the leg developed scarlet fever. He was taken home, where he recovered from his scarlet fever. His throat culture was negative and he was released. Three weeks later another child in the household developed scarlet fever. The burned boy's throat was again positive, possibly from the reservoir in the leg. After his throat became negative, he was held until his leg was healed. No further scarlet fever appeared.

Cultures were of value in still another throat condition. Severe sore throat is found fairly often, without rash or strawberry tongue, with positive beta type cultures. Almost by definition these are septic sore throat. Sometimes they are clinically mistaken for diphtheria. In such cases we run both a Loeffler slant and a blood agar plate. We would point out that both can be positive in an individual; in one of our cases it took a virulence test to show that it was not diphtheria, but septic sore throat. To a health department doing general milk work it is of special value to know whether a sore throat in the family of a milk dealer is of the septic-sore-throat-scarlet-fever family or not.

CONCLUSION

It is in locating the suspicious or sub-clinical case of scarlet fever, or in differentiating it from confusing diseases that we have found these blood agar plates most valuable. We do not consider them absolute.

Much remains to be understood about this organism, its exact relationship to scarlet fever, its occurrence in the ordinary population, etc. But by considering the results of these cultures as part of the total evidence in each case, we are sure that we have been greatly helped. We would recommend the procedure to other small health departments.

Medical Supervision in the Public Schools*

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WHAT are the functions of the School Medical Staff? From the medical point of view the answer may be given in one word—prevention. A general campaign is carried on to prevent the spread of contagious and communicable diseases. The pupils are examined in an attempt to prevent possible defects from becoming manifest and actual defects from getting worse. The aid of the parent and the private physician is sought for both preventive and remedial measures. Handicapped children are given special consideration. Employees and pupil candidates for working papers and athletic contests are examined. No actual therapy is carried on in the schools. There is so much in the program of preventive medicine that at no time should it be necessary for a school physician or nurse to partake of any actual therapeutic procedures except, of course, to render first aid in emergencies.

From the school viewpoint the functions of its medical staff may be summed up in one word—education. The pupils are taught the value of the periodic health examination and the importance of the correction of any defects found. Care of the eyes, ears, teeth, heart, lungs, nervous and skeletal systems are stressed. The importance of proper sanitation, hygiene, fresh air, sunshine, cleanliness, proper food, exercise, rest and good posture are emphasized. Supposed mysticisms of medicine are exposed, making the pupil more health conscious. He becomes receptive to proper medical care and attention. Just as bad health hampers education, good health aids it. Boards of education have realized the value of this to the extent that some states have passed laws making medical supervision compulsory. There are 38 states that have laws requiring or permitting employment of medical inspectors.[1] Actual statistics show that the pupil of today is sturdier, taller, and healthier than his more frequently rachitic parent. This may properly be attributed to health education.

In actual practice, how would such a program embodying all the above factors work out? From a practical point of view, the best idea of this school medical service can be secured from an annual report showing just what was done for the year. Certain items not particularly stressed during the given year would necessarily be omitted.

The *Annual Report* of the Albany Public School System for the year beginning September, 1932, and ending June, 1933, is summed up as follows. The city was arbitrarily divided into 4 districts; cosmopolitan, working class, residential, and high school. Each district was further subdivided into nurse group sections. The latter sections were made up of the individual schools. We may go further and subdivide the schools into the grades and the grades

*An analysis based on the Annual Report of the Department of Medical Supervision of the Albany Public Schools for the year 1932–1933.

into the individual pupils. With such a system we may realize how easy it is to note a particular phase of health referable to any pupil, any class, any school, or group of schools, in any district or in the city as a whole.

VISIBLE RECORDS

A visible and signalled health card system is used.[2] Different colored signals are used. The red signal signifies that a defect has been notified but not placed under treatment; blue that the defect has not been notified; yellow that the defect has been placed under treatment; purple that the defect has been operated on; and the black and white striped that the defect has been cured. There is a constant campaign to "Keep out of the red," red being the danger signals of untreated defects.

PERIODIC HEALTH EXAMINATIONS

Every pupil is examined once a year. Pupils will grow up with this periodic health examination habit which will continue throughout the remainder of their lives.

DEFECTS FOUND

The average for all the schools was 72 per cent, 8 per cent less than 2 years ago. Also 2 years ago there were almost 1⅕ defects per pupil while this year there were about ⅔ defects per pupil.

The schools in the cosmopolitan and working class sections of the city had the highest percentage of defects, the average being about 80 per cent. In the residential sections the defects found dropped to about 65 per cent. In the high schools the average was 60 per cent.

NUTRITION

All the pupils were weighed and measured; malnutrition was found in 672, or 4.6 per cent. The question of nourishment, particularly undernourishment, has been stressed during these periods of depression. It may be said that the cases of undernourishment found were readily taken care of by the City Welfare Department, the schools themselves, or various private welfare agencies. The actual number of undernourished cases was at no time much higher than is found under normal conditions.

Nearly all schools had milk supplied either from private or donated funds. As a matter of fact, of the 672 cases of malnutrition, 419 were undernourished and 253 obese. Albany's percentage of undernourished is low in comparison with most other cities of its size, many having malnutrition rates as high as 20 and 30 per cent. The curve for malnutrition, as noted on Graph I, shows that no definite area of the city is particularly involved.

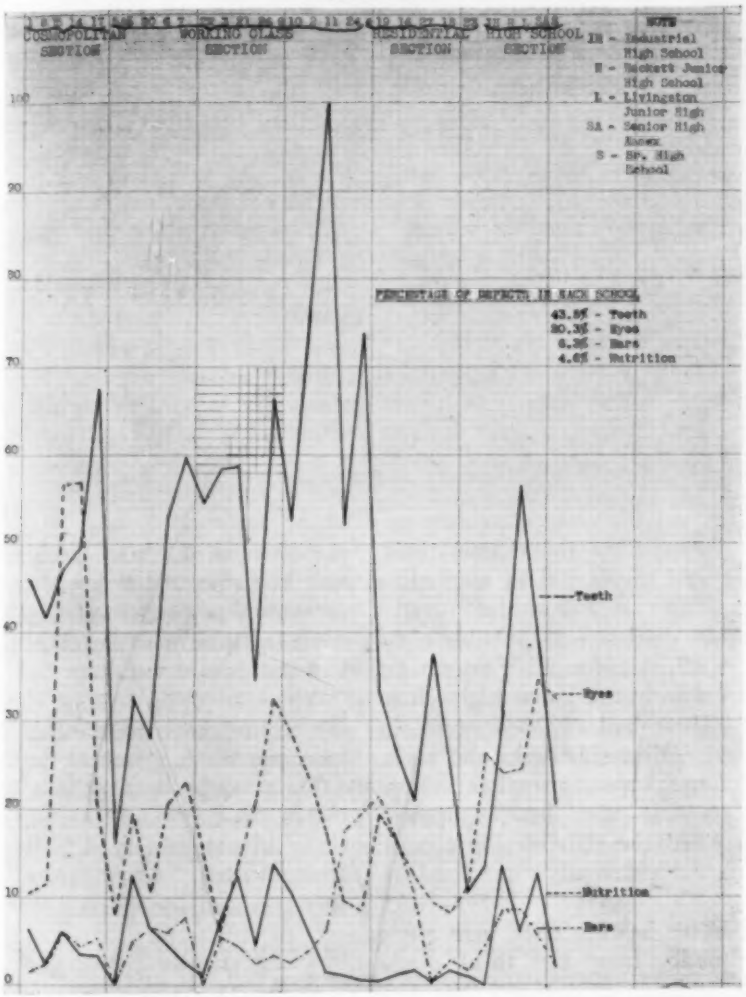
In estimating malnutrition the cases found were based on individual examination of the pupil rather than an attempt to standardize a child with some age, height, weight table. This is in accord with the State Department of Education and the Commissioner of Education of the U. S. Department of the Interior. The latter says: "No two children are alike and no two children can be made to follow one pattern of growth. The child should be compared with himself and not with the average child."[3] In the open air classes, which are the only ones in which age, height, weight tables are kept, each child has his own chart and compares only with himself.

TEETH

This curve (Graph I) showed that 43.5 per cent of the pupils had teeth defects. This is 7 per cent less than 2 years ago.

The 2 school dentists examined and cared for 1,449 needy pupils. Fifteen appointments are made for each dentist each morning from 1 nurse group of

GRAPH I



schools. The 2 dental hygienists examined 1,759 pupils and gave prophylaxis (cleanings) to 2,621.

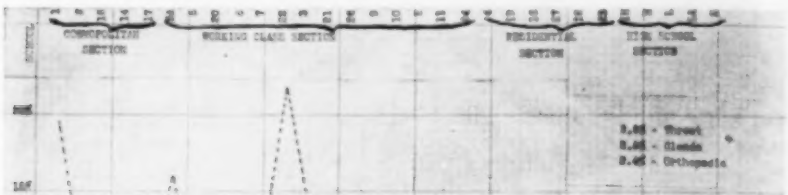
EYES

All the pupils had their eyes tested. There were 2,834 pupils (20.3 per cent) with eye defects (Graph I). This compares favorably with most other communities. Most authorities find 1 in every 5 have a visual defect. The local ophthalmologists disclosed that over 90 per cent of the pupils referred to them for visual defects required care and attention.

The percentages of pupils with abnormal vision showed that most of the visual defects are of the 20/30 type, this being the least manifestation of visual error and the most remedial.

Formerly the eyes had been tested by means of the Snellen Chart under varied conditions of illumination in the different schools. An average of 4½ minutes was required for each pupil. With our newly devised eye test cabinet, an average of only 1½ minutes was required. This cabinet has proper illumination. It is placed on the nurse's desk which she does not have to leave

GRAPH II



at any time during the examinations. Teachers and pupils aid in a monitor system.

A survey disclosed 53 possible sight saving candidates for all grades. Of these, 36 were in the junior high school grades. These had 20/70 or worse in both eyes. Adjustable desks and seats, special large type typewriters, large type texts and other new equipment were supplied the sight saving classes.

EARS

Audiometer hearing tests were given to all pupils from the third grade through senior high school. The tremendous economic importance, not only to the health of the pupils but also as far as teaching and education are concerned, of these hearing surveys and treatment of defects found may readily be seen.

The 4A tests and retests were done by the nurses. The 2A tests were done by the school physicians.

Pupils in each classroom were divided into 4 groups. Those with normal loss of hearing, from 0 to 9 per cent, were placed in the rear of the classroom. Pupils with borderline defects ranging from 10 to 15 per cent were placed next in front. Those having definite defective hearing of 16 per cent or over were placed still further front, while the front now contained those who had the poorest hearing.

There are 2 lip reading classes, 1 in the night schools and 1 held Saturday mornings for high school pupils.

Each teacher was given a list of her pupils showing how to group and seat them advantageously with reference to their hearing. A similar classification was arranged for vision.

THROAT AND GLANDS

Graph II shows that 8.8 per cent of the pupils have throat conditions which are essentially affected tonsils. This is 7 per cent less than 2 years ago. Two and two-tenths per cent have gland defects, essentially cervical or neck glands due to affections of the tonsils.

ORTHOPEDIC

Two and four-tenths per cent of the children have orthopedic defects (Graph II). These are chiefly flat feet, round shoulders, and other postural defects.

There are 2 teachers in charge of the orthopedic classes in the Child's Hospital. In addition there are 2

teachers giving home, other hospital, and bedside teaching. A swimming class for crippled children is being formed with the aid of Dr. Walter Craig, State Orthopedist.

HEART

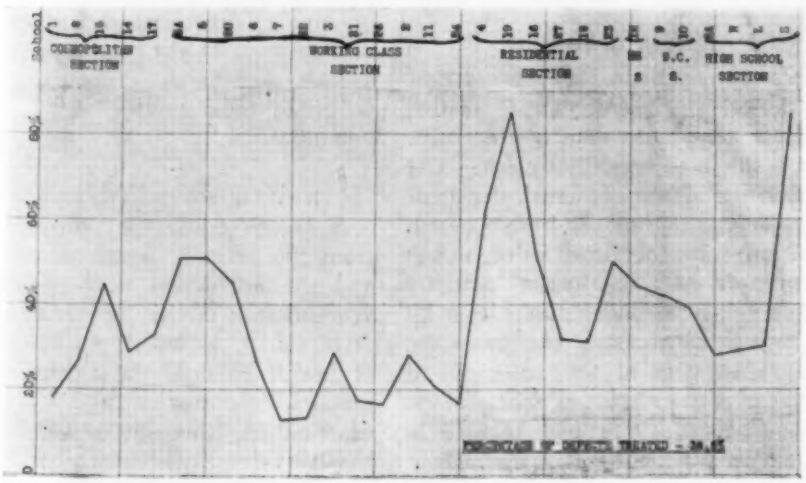
A survey was made in all the schools to find how many heart cases there were, what types, and what should be done medically and from the school standpoint. It must be remembered that heart affections still cause more deaths than any other single condition, and that the percentage of people dying from heart conditions is increasing. Proper preventive procedures may be carried out so as to avoid more serious disabling consequences and to permit each pupil to be better fitted for his school work. The survey was made in accordance with the standards established by the American Heart Association.[4] The routine for each pupil included at least a complete history, physical examination, cardiac examination, blood pressure, spirometer test, and cardiac functional test.

The survey disclosed 122 cardiac cases or 0.6½ per cent of the pupils, 55 boys and 67 girls. The causes in order of frequency were rheumatism, tonsillitis, congenital, scarlet fever, whooping cough, chorea, measles, influenza, bronchial asthma, and too rapid growth.

Three-fourths had mitral regurgitation, while almost one-fourth had the more serious stenosis of the valve. There was 1 case of regurgitation of the aortic valve and 1 case of general endocarditis.

In order to classify these cases as to functional ability so as to determine what the child could or could not do physically, each was given a cardiac functional test. Some were permitted mild physical exercise while others were excluded entirely from physical or manual training classes. The survey for functional ability showed that 46 per cent of the cardiac cases had to have their activities slightly limited; 35 per cent could carry on the ordinary activities, being careful to avoid undue strain. This is important in that it shows that not every individual with a heart condition must be made an invalid. These latter cases, however, need repeated examinations and observation. Six per cent of the cardiac cases require considerable curtailment

GRAPH III



of activities. There were no children in the schools with organic heart disease who were unable to carry on any activities without discomfort as such cases would be confined either to the home or to the hospital. Seven per cent of the cardiac cases were possible cases of heart disease, that is, pupils who showed abnormal signs or symptoms referable to the heart but in whom the diagnosis of heart disease was uncertain. There were 6 per cent of the cardiac cases designated as having potential heart disease, whom it was advisable to follow because of the presence or history of a causative factor which might bring about heart disease. The distribution of heart cases was approximately the same for all sections of the city.

NOSE, DERMATOLOGICAL, ABDOMINAL, PULMONARY

All these amounted to less than 1 per cent.

DEFECTS NOTIFIED

Ninety-two per cent of the defects found were notified. This is in keeping with the general program of prevention where the slightest possible defect may result in most serious consequences so that all parents as nearly as possible are notified of defects found.

DEFECTS TREATED

This curve (Graph III) showed that 36.6 per cent of the defects were treated, or 3 per cent more than 2 years ago. This is the most important chart. The number of children examined, the number of defects notified, and other health procedures are of little value unless the conditions found are actually treated or placed under observation by the private physician. The more defects taken care of the better fitted are the children to pursue their studies.

The highest percentage of defects treated, 85 per cent, was in the Senior High School. The schools in the residential sections were next; then the cosmopolitan and working class sections. The remaining schools ranked between 20 per cent and 50 per cent.

ABSENCES

Seven per cent of the pupils were absent for all reasons during the past school year; 3.9 per cent of them for illness.

The highest percentages of absence due to illness as compared to the total absences were in the residential sections where 1 school had as high as 95 per cent. The high percentage of absence due to illness in the residential sections may be due to the fact that the children are kept out of school for lesser ailments. As has already been noted, the percentage of pupils with defects treated is also comparatively high in the residential sections.

The most common conditions for which pupils came to the nurses were, in order of frequency: colds, headaches, stomach and other abdominal complaints, toothaches, skin conditions and injuries. Colds account for about one-half of all absences for illness.[5]

ANTIDIPHTHERIA CAMPAIGN

Schick tests disclosed that almost 25 per cent of the children were naturally immune to diphtheria and required no inoculations: 74 per cent are inoculated against diphtheria. Pupils are urged to go to their private physicians for immunization.

HEALTH EDUCATION PROGRAM

A health education program, aside from the periodic health examinations and the instruction with reference to prevention of disease and caring for defects found, included the distribution of health bulletins on hearing, vision, measles, diphtheria, periodic health examination, whooping cough, first aid, the use of the audiometer, etc. This

program also included teaching of health habits through individual contacts with pupils, teachers, and parents.

SANITARY SURVEY

The newer schools have modern up-to-date methods of sanitation and in the older type of school buildings the conditions are kept as satisfactory as possible.

TEACHERS EXAMINED

There were 20 teachers examined. Low blood pressure and poor vision constituted the main group of physical defects among the teachers.

WORKING PAPER EXAMINATIONS

There were 1,141 examinations made; 1,069 children were granted unlimited permits; 20 limited permits; and 52 were refused or had their permits deferred.

RINGWORM

Two years of bacteriological investigation to substantiate our clinical findings have been completed by Dr. Harold Feigenbaum, in charge of Chemical Laboratories at Rensselaer Polytechnic Institute. A powder containing 80 per cent boric acid and 20 per cent sodium thiosulphate is still being successfully used. The less practical footbaths of 15 per cent sodium thiosulphate have been discontinued.[6] In a recent article[7] it was noted that most schools and health centers in the country have adopted fungicidal procedures similar to those used in the Albany public schools.

TUBERCULOSIS

Conferences were had with the Albany County Medical Society urging them to initiate an antituberculosis campaign in the schools. The Vaughan Plan was recommended so that the pupils could go to their private physicians for tests and examinations.

SUMMARY

The duties of the school medical staff are twofold, medical and educational,[8] and these are mostly interchangeable.

The medical phase of the work is one entirely of preventive medicine. The pupils receive annual periodic health examinations by the private or school physicians. An attempt is made to have all defects corrected by the private physicians and to have all the pupils vaccinated against smallpox and inoculated against diphtheria. Campaigns are constantly carried on to prevent the spread of contagious and communicable diseases. Special examinations and considerations are given to handicapped pupils, to candidates for athletics, and for employment certificates. Employees of the school are examined. Other than for emergent first aid—absolutely no therapy is given.

The educational part of the program calls for health instruction, particularly individual or in small groups. Important matters considered are the periodic health examinations and correction of defects, care of the various parts of the body, and sanitation and hygiene. The school is made to fit the pupil as much as possible from the health standpoint. A healthy child, a healthy teacher, and a healthy school environment is the ideal combination sought.

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The Use of Laymen in Official Public Health Nursing Programs*

CITY

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WE are all prone to say that health is a matter of education. How shall we interpret this rather loosely used phrase? Some regard it as an advertising of the health department in order to create a favorable attitude toward it. Others look upon it as an accumulation of academic data on health stored away but little used. Still others consider that each individual in the community must play his part in changing attitudes and ways of living to those which make for health if health is really a matter of education.

"The informed citizen takes an advanced course in public affairs by becoming an educator himself in his personal contacts and through local civic associations," Courtenay Dinwiddie of the Commonwealth Fund says in commenting on public health and public opinion.

It is interesting to scan the history of the use of lay people and the influences which have given impetus to a fuller appreciation of their part in the program for community health, more particularly as they relate to public health nursing.

Some of us have had an opportunity in certain communities to observe a shifting of responsibility for home care of the sick from the non-professional to the professional groups. Then, we later may have had an opportunity to observe a slowly dawning realization of the lost values in the assumption of the whole program by the professional group and a consequent revision of program which includes both professional and non-professional, resulting in a nice division of responsibility.

Public health nursing had its inception in visiting nursing. Visiting nursing has had a strong emotional appeal to lay people. The care of the sick poor in their homes by visiting nurse organizations was sponsored by lay groups. Public spirited citizens fostered the work of visiting nurses until the community was convinced that public moneys should be used for the preventive aspects of the visiting nurse service. Since the lay boards of these organizations were often particularly concerned with the raising of funds, interest in the work under the official agencies sometimes lapsed when there was no longer need for the type of service formerly given. Perhaps a further cause of the non-use of lay groups in official agencies was an attitude of resentment of any "interference" on the part of some of the older staff members. This attitude reacted detrimentally upon any sporadic interest which might have been evidenced by any lay person or group.

Public health workers have been interested in the development of a broad

* Read before the Public Health Nursing Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

health program founded on scientific principles, perhaps losing sight of the need for a sound educational program which includes Mr. and Mrs. Everybody in the community. There was an attitude with some of the workers that "this was *our* job and the public depends upon us to do it," and they have been slow to acknowledge the values of service and interest from the non-professional group.

Conditions of the past few years in the public health field have brought us face to face with reality. Municipal treasuries are low; tax payers seek a way out; appropriating bodies are prone to cut their budgets where there will be least pressure from influential political groups. And we have suffered.

Looking back upon the records of health departments as they struggled under the stigma of city hall influence, there is little wonder that it was not desirable to invite the close scrutiny of the community's citizens. There is little wonder, too, that it was in the unofficial public health nursing organizations that high standards of work were set.

With the development of earnestness of purpose, of a real desire to render to the public, nursing service of quality in official public health nursing organizations, we now want to be understood; we now know the need of an informed public; we now know that an understanding public means protection of the thing we have builded. Too, we know the inherent possibilities for a finer understanding and appreciation of the rapidly growing official nursing services. So much for a story of changing attitudes and widening perspectives.

Now that we have discovered that we need each other, how may we create interest in the lay groups and then direct it toward useful ends? Each city will find, in various established groups, a lively sympathy and curiosity about what is going on in the health field. What we would do, is to reach this fine spirit of helpfulness, organize, inform, and direct it into regular, orderly channels which are so much in need of help.

The Federated Clubs and Parent Teacher Associations have health sections. They may serve as rallying points. The Chamber of Commerce has its public health committee; Junior Leagues are particularly helpful aides; church groups find certain phases of the service challenging. One city reports a continuous diphtheria prevention campaign carried on by the American Legion. The luncheon clubs, Rotary, Kiwanis, Civitan and others have projects closely allied to the field of public health nursing.

When interest is aroused, latent ability for leadership must be detected, and scattered interest crystallized into action. I like to think of the logical stages through which the organization of lay groups moves: (1) There is participation in a broad educational program, learning something of the community's needs. (2) We would expect participation as a volunteer in some of the activities which are set up to meet these needs. One of the recommendations of the Welfare Committee of the Junior Leagues relating to volunteer service states that "one of the ultimate objectives of volunteer service should be to qualify for intelligent board membership in welfare agencies." (3) We would expect a selection of leaders to be made from this group of volunteers to act as members of an advisory committee. In this committee would be developed a broad social vision which it will, little by little, interpret to its community.

Let us illustrate the steps through which a city bureau may go in order to secure lay interest and direct the activities which are the logical outcomes of such interest.

A department of health in one city without a visiting nurse organization, realizing its need for greater lay interest in the whole public health program, found a real desire for fuller knowledge of what was done to protect the community's health in the District Health Chairman of the Federation of Women's Clubs. A plan was laid for monthly meetings at the department headquarters, bringing together the health chairmen of some 60 local clubs for study of local problems. They learned of the activities carried on in their community to meet these problems and of some of the pressing needs as yet unmet.

At the end of the first year's study they sponsored a week's Institute for lay groups. This was conducted by Evelyn K. Davis, Assistant Director of the National Organization for Public Health Nursing. The theme of the institute was "How may members of non-professional or lay groups prepare themselves to participate intelligently and effectively in a program for the promotion of community health and welfare?" The response to this institute was gratifying, indeed.

The department of health has continued to carry on the education of this changing group of health chairmen. The health chairmen have reported on the subject discussed at each meeting to their individual clubs for the 3 years since the initiation of the plan, thus disseminating to a larger group knowledge of the organization and activities of their department of health.

Special interests have developed, some in public health nursing. Sometimes it has been the appeal of a Mothers' Day program, or the story of diphtheria prevention which has stirred the desire to take an active part.

These same women have sponsored an annual publicity campaign for Mothers' Day and have fostered the organization of classes for expectant mothers in several of the health centers of this city.

The summer round-up chairmen of the Parent Teachers' Association have had a similar series of demonstrations, resulting in an intensive successful house-to-house canvass for diphtheria prevention, in conjunction with their own canvass for school entrants.

Negro groups are as alert to serve their race as are the white people.

The organization of an advisory committee from *below upward* is sounder than from *above downward*, according to Dr. H. S. Mustard, in his report of the Commonwealth Fund Demonstration in Rutherford County, Tenn. He says "It is wrong to assume that a leader is necessarily interested in the health program." He advocates the organization of local committees along specific lines. These committees may be kept reasonably busy supplying volunteer service. The busier they are the more they assume responsibility.

The public health nursing field is technical and at first glance it may seem that only highly trained professional workers could carry on the program, but there are many places for the non-nurse. It is an ancient calling, this service to people, and not a new profession. Weighing and measuring children is work most women love. Transporting patients to clinic, making garments for new-born babes, taking records for the doctor in clinics, making dressings and supplies, or entertaining youngsters while their mothers attend classes at health centers, are all activities in which volunteers may engage and find joy in doing.

Do all those who signify a willingness to serve maintain their interest and continue to grow with the organization? Not unless there is careful selection of volunteers and a definite plan for their instruction and the development of leadership. Let us analyze the motives underlying an interest in

public health or in public health nursing. It may be just a hobby; the person may be an "uplifter" or a "lady bountiful"; or may find in this activity an outlet for a pent-up spirit; or may have genuine interest in social progress and social welfare. If it is a genuine interest in social progress and welfare, much effort will be saved in the sifting process.

The Junior League has carefully planned a placement service for volunteers, fitting the worker into the job which is most challenging to that individual. It is advocated, too, that definite instruction with demonstrations should precede the initiation of the volunteer into any activity. We provide for growth and refresher courses for our professional staffs, and often let the interest and service of the volunteer lag because of lack of cultivation.

The liabilities and problems of volunteer service, such as irregularity and lack of continuity of service, should diminish with careful selection, placement, training and supervision. The advantages of volunteer service, such as more interest and better understanding of the work of the organization, the saving of nurses' time, the economic value in actual service rendered, the publicity value, more than offset the disadvantages.

A few municipal public health nursing bureaus have reached the point of organization of an advisory committee of lay people which assumes some responsibility for a continuing and growing community nursing service. St. Louis, Mo., and Syracuse, N. Y., each reports lay committees on nursing service whose function is the interpreting of the service to the community. Some other cities, such as Nashville, Tenn., Charlotte, N. C., and Savannah, Ga., have joined the forces of all agencies, public and private, doing public health nursing and are affiliated under the official health department. The policies of the organization are determined by a board made up of representatives from the several contributing and interested agencies. Such a coöperative arrangement should have certain distinct advantages. Bertha O. Yenicek, Superintendent of the Municipal Visiting Nurses of St. Louis, comments on the advantages of a lay advisory committee thus:

> Its advice and counsel are just as necessary for the development of the program, policies, and standards of the official agency as in the private agency—indeed more so, because of the complexities of city governmental administration. A lay advisory committee may be quite important also in securing an adequate appropriation from the city's committee on finance for the public health agency.

We conclude then that our aims in using laymen in our public health nursing programs are these:

1. To secure intelligent public response.
2. To secure and utilize volunteer effort.
3. To organize advisory committees who will aid in guiding public opinion and in advocating appropriation of public funds with intelligence and vigor, and who will aid in setting and maintaining the highest standards of personnel and of work.

What are our results thus far? We have builded through the years a stronger partnership between the professional and non-professional groups. We are directed toward organization of specific groups of lay citizens dedicated to the fostering of the purposes of the public health nursing bureaus of our official agencies with a consequent strengthening of all public health nursing in our communities.

DISCUSSION *

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I WAS especially interested in Dr. Dowling's statement relative to the attitude of the present-day official agency which is engaged in public health nursing. He said: "With the development of an earnestness of purpose and a real desire to render public health nursing service of quality, we now want to be understood; we know that an understanding public means protection of the thing we have builded."

I think Dr. Dowling is quite right and I believe that any department which has a thoroughly efficient service, or is rendering the best possible service for the expenditure which is available, *wants* the public to know what it is doing. One is always suspicious of a department or an individual who is "afraid of interference" from an advisory committee, or too close contact with a nonofficial organization. One usually finds that the department, or the individual who is afraid of interference has not been carrying out the principles which make for quality nursing, and he or she does not want to be found out, or, to use Dr. Dowling's expression, "to be understood."

Dr. Dowling mentioned that the nonofficial nursing agencies were the ones who originally set the high standards for public health nursing work, and I think we will all agree with him. However, recent studies indicate that the quality of work which is being done by official public health nursing agencies today compares very favorably with that of the nonofficial agencies, and I wonder if the closer relationship between official and lay groups which is quite evident in various sections of the country, is not one factor in securing that improvement? Official health directors are realizing that they are likely to lose much of the fine organization which they have built up unless there is an informed and intelligent group of citizens ready and willing to promote the interests of their departments.

I liked Dr. Dowling's statement in regard to the three steps which are desirable in promoting the organization of lay groups. I believe that these three steps are quite essential to successful lay participation in the health program. I wonder if the apparent failure, or perhaps I should say, the doubtful value, of some volunteer programs is not due to the fact that we are expecting service from folks who have had little opportunity to know what we are trying to do, and we have made little effort to help them to become acquainted with our work. Then too, from the other standpoint, sometimes we find an enthusiastic citizen who wants to "help on some health committee," and yet when the health department calls on her for service she begins to make excuses, or, worse yet, she fails to do what she has promised to do. In other words, there are lay helpers who want to take the last step first and they are not willing to take the first two.

I am primarily interested in the rural field and I have been trying to picture how the rural health department can provide for these three steps in the utilization of lay workers. As Mrs. Trawick has stated many rural communities have very few if any com-

* This discussion applies to the paper by Mrs. Arch Trawick in July Journal as well as to Dr. Dowling's paper.

munity organizations through which the health department can work. It is often necessary for the health department to help to promote organization before it can obtain concerted action from the community. One of the county nurses whom I have had the privilege to observe during the past year has made excellent use of lay groups and yet she found practically no organizations present when she began her work in that county. She began by organizing Mothers' Clubs in the various communities, and while the lessons were largely concerned with infant and maternal care, the facilities for general home and community sanitation were always discussed. Following the formal class periods, the nurse continued to use the club members as her committee members and she called on them for volunteer service very frequently.

For instance, a midwife came to the office one morning to report that she had just delivered a young mother whose husband had deserted her, and that the mother was alone, had no food in the house, no clothing for the baby, and no one to take care of her. No doubt every public health nurse who worked in a county which had little or no organized welfare work, met similar situations very frequently last year, but I doubt if many of them handled the situation more effectively than this nurse. She had her day's work planned so she left a little earlier than usual and stopped by to see the patient and to verify the midwife's story. Then she went directly to the leader of the Mothers' Club in that community and presented the facts to her. She said:

I'll be busy until evening, but I will call in to see Mrs. Blank when I come home tonight and when I get there, I want to find her well cared for. Here is a card which you may take to the county poormaster, and he will give you a grocery order for her; and I am sure I can rely on you women to do the rest.

When she returned to the patient that evening, this is what she found. Six women had been in and cleaned the house thoroughly. One of the men in the neighborhood had gone to town on his mule and had got the grocery order from the poormaster, and the women had left a supply of food all cooked and ready for the mother and her other two children. The women had brought one of their "Club Layettes" for the new baby, and he was clean and asleep in an improvised baby bed. And, by the way, those layettes which were prepared by the clubs were too clever for words! The majority of the club members were very poor and while the preparation of the layettes was more or less a social activity for the group, the purchase of materials was another matter. The layettes were made entirely from used sugar and flour sacks. The sacks were first washed and usually bleached, but sometimes the original Gold Medal or Pillsbury's Best sign was still very much in evidence. All of the garments were cut according to the Maternity Center patterns though, and very neatly made, and you would be surprised to see what nice soft little garments can be made from sugar sacks.

In addition to the above service, the nurse found that the women had made out a schedule and one of them had agreed to come each day to give the mother the necessary care. Through their classes, they had been taught how to care for a mother and her baby; they knew how to recognize abnormal symptoms, and they knew how to get in touch with the nurse if anything appeared to need attention. Thus it was not necessary for the nurse to return to this home for a week and in the meantime she could be reasonably sure that the woman and her baby were getting the necessary care and attention.

That nurse has taken the first two steps in the organization of health committees. She first taught them something about their own and their community's health needs and what to do about them, then she gave them ample opportunity to practise what they had learned through volunteer service. Incidentally, when the county officials decided to do away with the health department a few months later, as an economy measure, these women and many others, made such a protest that the idea was soon abandoned and the health department was retained, in spite of the depression.

Mrs. Trawick mentioned the conflicts and unnecessary expenditures which sometimes occur because national boards or agencies, in promoting nonofficial health work in local communities insist upon independent action from their groups. We have all experienced some of those difficulties at times. One point I wish to make is that the official agency sometimes forgets that any agency which depends upon popular public support has to be able to point to certain definite projects as its own. On the other hand, any lay organization or nonofficial health agency which embarks upon a health program before trying to harmonize its plans with those of the existing official health agency is violating the most fundamental principles of good organization. A functioning advisory health council, made up of representatives of all local agencies and individuals who are interested in health promotion, will usually solve the problem. But the council must be "non-sectarian." It must be a county health council, not a tuberculosis, a Red Cross or a child welfare council, although each of those organizations should be well represented.

Mrs. Trawick also mentioned that it was difficult for her to differentiate between the services which her organizations rendered to the public health nursing service and those rendered to other public health services. I quite agree with her and I would like to ask—Do we want to differentiate? I would like to emphasize that the nurses are not the only workers in a health department who are benefitted by lay advice and service. In a county health department such as Mrs. Trawick has described, I favor an advisory health council which serves the entire health department. The same persons who are interested in the nursing service are interested in clean milk, safe water, the prevention of diphtheria, and hospital facilities for tuberculosis patients. After all, all of these are public health nursing problems too. Just as an intelligent lay advisory service has improved the quality of the nursing service, so it can influence and stimulate a better quality of medical and sanitation service.

The health officer, the sanitary officer, and the nurse should all participate in the county health council meetings, from time to time. The members of the council should be equally familiar with the work of each.

Qualifications and Training of Local Health Officers*

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IT has been more than 150 years since Johann Peter Frank, in his work on Medical Polity, first presented the idea of "scientific medical police"; and the first suggestion that university degrees be conferred in "state medicine" was made nearly 70 years ago by Henry Wildbore Rumsey. Yet there are still many states in which there are no legal requirements that a local health officer have qualifications other than those of a general practitioner of medicine. In some states not even this is required. It is obvious that for the modern practice of public health, involving the application of knowledge from many and varying sciences, special training is necessary. "An incompetent physician endangers the health of the patient whom he attends; the incompetent health officer endangers the health of his entire community."

Students of the problem agree that local health officers need special qualifications in addition to those required for the general practice of medicine. This need has been discussed repeatedly in the Association and committees have studied it for long years. The essential facts are clear, but we need action—legal action—which will require that every person holding a responsible administrative public health position shall possess certain minimum qualifications specified in law or in state health regulations.

As early as 1907 Biggs proposed definite requirements for the eligibility of physicians as health officials. Sir William Osler in one of his last public addresses said, "The health officer should have special training in sanitary sciences, and special courses leading to diplomas in public health should be given in the medical schools. Were the health of the people made a question of public and not of party policy, only a skilled expert could possibly be appointed as a public officer, not, as is now too often the case, the man with political pull."

New York State has been working along these lines for 20 years and has made some progress. When the Public Health Council was established in 1913, it was given authority to prescribe qualifications for local health officers and certain other public health personnel. The following year standards were established for local health officers. The State Department of Health, coöperating with a number of medical schools, offered extension courses and short residence courses in public health. Because of the great variation in the size of municipalities, ranging from the small rural towns to the large cities, any one set of standards would be too high for the one, or too low for the other.

In succeeding years laws were added

* Read at a Special Session of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

which gave the Public Health Council authority to prescribe qualifications for directors of divisions in the State Department of Health, district state health officers, public health nurses, bacteriologists-in-charge of laboratories, and, more recently, pathologists. These requirements have been implemented by other provisions of law which require:

1. That approval shall not be issued to a laboratory unless the director possesses the qualifications established by the Public Health Council.

2. That county health commissioners shall devote their full time to the duties of their office and shall possess such qualifications for office as shall have been approved by the Public Health Council.

3. That health officers appointed after 1931 in cities of more than 50,000 population shall devote their full time to the duties of their office.

4. That "notwithstanding the provisions of any general or local law or charter a physician who is qualified by the Public Health Council shall be eligible for appointment as health officer.

This last provision invalidates any restrictive provisions of city charters and other laws concerning qualifications such as residence, length of practice in the municipality, or otherwise. The enforcement of qualifications is aided also by the authority of the State Department of Health to grant or withhold state aid. State aid to county departments of health and other local health activities, may be withheld if the standards of service, including the qualifications of the health personnel, do not meet the prescribed standards. Further control is given by state authority to remove from office an unqualified health officer.

In 1930 this whole subject was reviewed by the New York State Health Commission and further enactments were recommended to require varying standards for local health officers, depending upon the responsibility of their position and the area served. Local health officers in New York State may be grouped, broadly, into two classes: (1) the full-time health officer, serving cities of more than 50,000 population, the full-time county commissioners of health and the district state health officers; (2) local health officers of smaller jurisdictions.

A further recommendation of the State Health Commission that all counties be required to establish county departments of health, with full-time personnel, has not yet been enacted, and we have only 5 such departments in our 57 counties. The remaining counties are served by a state supervisory staff of 14 district state health officers, state district nurses, sanitary engineers and milk sanitarians, and by local health officers in our towns and villages.

Excluding county units and cities over 50,000 population, there are 1,201 local health districts. By the appointment of one health officer to serve more than one town, village, or consolidated district, these 1,201 districts are served by about 800 health officers. A minimum of $.15 per capita is paid to these health officers, up to $1,200 per annum. In addition, fees for special services frequently increase this income considerably.

One-fourth of these local health districts have a population of less than 1,000; one-third have populations between 1,000 and 2,000; another one-third have populations between 2,000 and 8,000; and only 8 per cent have populations between 8,000 and 50,000. Eighty-two per cent of these local jurisdictions have populations less than 4,000 and pay a minimum salary of less than $600 a year. These men are practising physicians and frequently the health officer is the only physician in the town or small village. The requirement of special qualifications for this group obviously cannot be so stringent as for the full-time position.

After intensive study, conference with local health officers, medical educators

and others, the Public Health Council in May, 1932, completely revised its qualifications for local health officers. Two classes were established, the first to include district state health officers and health officers of counties and of cities of more than 50,000 population, and the second to include smaller municipalities. A requirement for every health officer is that "he shall be licensed or eligible for examination for license to practise medicine in New York State."

The requirements are:

Regulation 5. Qualifications, Grade I. The qualifications for health officers in Grade 1 shall be practical experience and/or special training and education in public health, consisting of:

(a) Not less than 4 years of full-time experience in a responsible public health position. Or,

(b) Not less than 2 years of full-time experience in a responsible public health position and the completion of a course in public health approved by the public health council of at least 1 scholastic year in residence. Or,

(c) A combination of part-time or full-time experience in public health with special training which combination in the opinion of the council is the equivalent of either of the above qualifications.

Regulation 6. Qualifications, Grade II. The qualifications for health officers in Grade II shall be practical experience and/or special training and education in public health, consisting of:

(a) Four years' part-time experience and prior to June 1, 1932, the completion of a course in public health approved by the public health council.

(b) The completion of a course in public health, of less than 1 scholastic year in residence, approved by the public health council as qualifying for this grade subsequent to June 1, 1932.

(c) The completion of an undergraduate course in public health approved by the public health council as qualifying for this grade.

(d) Other practical experience and/or special training and education in public health work which in the opinion of the council is the equivalent of any of the above qualifications:

Provided, that under special circumstances specified in writing by the local board of health or other appointing power or by the proposed health officer, the public health council may waive the requirements for a health officer in Grade II as to any proposed appointment, *such waiver to be valid only for the term of the proposed appointment.*

Additional regulations provide that any physician, or any local appointing officer, may submit to the Council the qualifications of a physician for opinion as to whether or not they meet prescribed standards; that such person may be required to take "such written, oral or practical examinations in public health as the Council may direct"; and that the Council may maintain lists of persons who have submitted satisfactory evidence that they possess the qualifications for either of the two grades.

Under Regulation 5(b), courses in public health at Johns Hopkins and Harvard have been approved. It should be noted that for Grade I a minimum of 2 years' experience is required in addition to an approved public health course.

For Grade II two separate types of courses will qualify. First, a "short course" of less than 1 scholastic year. This course is being given by the State Department of Health in coöperation with the Albany Medical School under the direction of one of us who is also in charge of teaching public health to undergraduates. This extension course is designed to qualify physicians now in practice and is an elaboration of previous but less extensive courses conducted in former years by the state in coöperation with various medical schools. In order to meet the needs of the health officer in the smaller municipalities, who receives a comparatively small income from his health work, a course was devised so that the major part could be accomplished in his office at times available from his practice. The extension course is divided into three parts:

(a) *Assigned readings from texts*—These

TABLE I

LOCAL HEALTH OFFICERS
NEW YORK STATE

(Excluding health officers of cities of 50,000 or more and of the 5 counties with county health departments)

Number of local health districts			1,201
Number with health officer		1,188	
Number of vacancies		13	
Number of health officers serving 1,188 districts			786
Grade II or not qualified		786	
		Number	*Per Cent*
Health officers, not including Grade I:			
Not qualified		146	19
Qualified—		568	72
by undergraduate course	39		
by extension course (52% of 786)	404		
by special experience	61		
by long and satisfactory service	64		
Serving under waiver, pending completion of extension course		72	9
		786	100

include the Public Health Law, Sanitary Code, and State Department of Health publications. There are 20 assignments during the year. After reading the assignment the student refers to a "test of study" and writes answers to questions. Students last year reported an average of 6 hours required to do each of the reading assignments and prepare the "test of study."

(b) *A Conference of 1 day each month with the district state health officer*—At each of these monthly conferences a separate phase of local health work is discussed and the student is coached in the practical application of health requirements and the conduct of health activities. One-half of each conference day is spent in observing and participating in such health activities as: inspection of pasteurizing plants; attendance at clinics for tuberculosis, venereal disease, child hygiene, and mental hygiene; administration of Schick and Mantoux tests; visits to approved laboratories, to sewage disposal and water filtration plants.

(c) *One week in residence at Albany*—This is required after completion of the 20 written assignments and 8 monthly conferences. This residence week is for purposes of review, lectures and demonstrations by a temporary faculty of experts in various public health and clinical branches and for an examination when necessary to test the candidates' fitness.

About 40 students were graduated last year and approximately 100 will take the course this year.

Realizing that instruction in public health should be given more fully in undergraduate medical courses, the provision (Reg. 6-c) permits qualification for Grade II by an approved undergraduate course in public health. Before standards were established for these courses, conferences were held with deans and professors of preventive medicine in each of the medical schools of the state. A committee from this group of medical educators itself drew up for approval by the Council the minimum requirements which must be met in order to entitle a course to approval.

This has resulted in the stimulation of public health teaching to all undergraduates and, obviously, has resulted

in the advancement of preventive medicine well beyond the immediate advantage of qualifying young physicians for positions as local health officers in our smaller health districts.

The results of our efforts to require minimum qualifications for health officers are summarized in Table I. It will be noted that more than 80 per cent of them will have met prescribed qualifications by the end of this scholastic year. The remainder, to a large extent, are serving under waivers chiefly because no qualified physician is available in the small jurisdictions.

Of interest in the training of other public health personnel, but not appropriate to the present title, are the programs of the State Department of Health for the training of public health nurses, operators of water purification and sewage treatment plants, operators of milk pasteurizing plants, bacteriologists, and other health personnel.

In summary, I may say that our practice has developed along very simple lines. We recognize the need for a physician to have special training in order to be a satisfactory health officer. Adequate laws have been enacted which require special training. For our full-time positions high standards have been set. Our local health structure admittedly is unsatisfactory in its multiplicity of small units and part-time service. The nature and extent of the training possible naturally is limited by the character of the positions. We have fostered courses and assisted in the conduct of courses designed to provide necessary training. In addition, the courses have been of benefit in giving to a large group of practising physicians a broader concept and a better understanding of public health and preventive medicine. Other states, with more satisfactory local units of government, should be able more readily to enforce high standards. The American Public Health Association can and should take the lead in advancing public health in this country through improving the qualifications of local health officers.

A Measles Year

THERE have been reported to the U. S. Public Health Service by state health officers from January 1 to June 9, 1934, 602,990 cases of measles. By periods of 4 weeks, these have been distributed as follows:

These figures include reports from all states except Nevada. Reports of measles are always incomplete, as it is too often regarded as a mild disease and many cases are not reported.

4 weeks ended	*Cases*
Jan. 27, 1934	51,498
Feb. 24, 1934	94,984
Mar. 24, 1934	128,505
Apr. 21, 1934	132,389
May 19, 1934	124,923
June 9 (3 weeks)	70,691
Total (23 weeks)	602,990

It is evident from the figures that the epidemic is now subsiding.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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PUBLIC HEALTH IN THE FAR WEST

THERE may have been a time when some members of the American Public Health Association would have agreed with Daniel Webster when, as Secretary of State in 1843, he intimated to Dr. Marcus Whitman, of Oregon Trail fame, that the Rocky Mountains formed a natural barrier to the westward progress of civilization. Nevertheless, some degree of public health civilization did reach the West. Whether through spontaneous generation or a series of bitter experiences, or a combination of both, western public health organizations, both official and voluntary, have grown apace.

The West has always had its public health problems, some of them unique. Famine and illness threatened the followers of Brigham Young during their first winter in Utah (1847). Cholera took nearly one-fourth of the population of Sacramento in 1850 and 1851. A peculiar fatal illness resembling typhus, but occurring only on one side of the tributaries of Idaho's Snake River, was known as early as 1873, and first described by Maxey of Boise in 1889.[1] Subsequently, Montana's Bitter Root Valley became the stage for one of the most dramatic episodes in public health, resulting in partial solution of the Rocky Mountain spotted fever problem.

Migratory tuberculosis first became a problem in Colorado and California in the 1850's, and it continues a serious problem in the western and southwestern states today. It is recorded that in 1871 the tuberculosis death rate in one section of California reached 344 per 100,000 population.[2] The highest tuberculosis death rates known in the United States today are in Arizona, 345.7,[3] New Mexico, 302.5,[4] Colorado, 165.7,[5] California, 132.6.[6] In none of these states has the rate of reduction of tuberculosis deaths been equal to that of the registration area since 1900.[7]

Coccidioidal granuloma, now of increasing public health importance, and apparently endemic in western arid sections, was first described by Rixford in San

Francisco in 1893.[8] Dr. Beatty of Utah, Dean of western state health officers, states that he first saw cases of serious illness following bites by the deer-fly in the late 90's, and repeatedly called it to the attention of the Public Health Service, with the ultimate result that tularemia was identified. Plague was first officially recognized in this country in San Francisco in 1902. Three outbreaks have been recorded in California since then, the last in Los Angeles in 1924. It is endemic among California ground-squirrels, and a circumscribed, fatal epidemic among these squirrels has just occurred in the sparsely populated, eastern portion of Kern County.

Earthquake, fire, and flood, with their accompanying public health aspects, have been frequently known in this section. Shellfish sanitation, sewage disposal, and the sanitation of large irrigated areas have presented difficulties peculiar to the West. Following the pioneers, after preliminary discomforts had been overcome, came the horde of health seekers, easy prey for the cults, an ever-present problem in western public health administration. Cultism and smallpox are inseparable companions on the playgrounds of the West.

Until comparatively recent years, full-time health officers and adequately financed health departments have been few and far between in the West. It is not surprising, therefore, that western public health took some time to develop an *esprit de corps*, and yet developed it vigorously when it did appear. Considering their starting point, it would probably be hard to find any large section of the country which has developed a public health consciousness more rapidly than the West in recent years. In many respects, today's western public health picture is one of the most favorable of any in the nation.

For instance, the State of California has provided a state subsidy for local tuberculosis sanatoria since 1915. At present, 90 per cent of the population of this state has access to tax supported, locally administered tuberculosis sanatoria. Last year's Christmas Seal Sale in California, despite the 4th year of the depression, brought 3.3 cents per capita, and was exceeded only by Pennsylvania and New York.[9] Outstanding contributions in fundamental research concerning tuberculosis now come each year from Arizona, Colorado, California, and Oregon.

In the past 30 years, the West has contributed important fundamental data to our knowledge of vaccinia, alastrim, botulism, coccidioidal granuloma, plague, spotted fever, mottled enamel, shellfish sanitation, and psittacosis.

Important advances in mental hygiene and the teaching of psychiatry to medical students have been contributed from the University of Colorado Medical School. Excellent public health research is coming from the Hooper Foundation for Medical Research, the laboratories of the California State Department of Public Health, the U. S. Public Health Service laboratories at Hamilton, Mont.; Seattle; San Francisco; and Pasadena, also from the medical schools at the Universities of California, Southern California, Colorado, Oregon, and Stanford. Good courses in public health are being given to undergraduates in the medical schools of the Universities of Colorado, California, Southern California, Oregon, Stanford, and Loma Linda. Splendid courses for public health nurses are offered in the University of California, University of Oregon, and University of Washington.

Los Angeles County is reputed to have one of the best organized health units in the United States. It is to be credited with having retained and supported the same health officer for nearly 20 years. The San Francisco City and County Health Department is one of the country's outstanding examples of successfully combining the public health function with that of hospital administration. For

over 20 years, this department has operated the school health program in the San Francisco public schools. Western cities have entered the U. S. Chamber of Commerce Health Contest in surprising numbers and have made excellent showings.

Since 1928, when the Western Branch of the American Public Health Association was organized, the Western membership of the Association has increased from 125 to nearly 500. In addition, they list well over 1,000 so-called Regional Members who are not necessarily full-time public health workers. It is in recognition of these gratifying public health advances in the West and of the success of the Western Branch that the Association this year in holding its 63rd Annual Meeting joins the Western Branch in observing its 5th Annual Meeting in Pasadena, September 3 to 6, inclusive.

The Western Branch, as well as all public health workers of the Pacific Coast, joins in a most cordial invitation to our parent Association and the public health workers of the middle states and the East. We know that we can learn much from them and we hope that owing to differences of climate, endemic diseases, immigration, etc., they will find something of interest in our western country.

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POLIOMYELITIS IN CALIFORNIA

WE have been aware for some time that poliomyelitis was unusually prevalent in California, especially in the County and City of Los Angeles. From January to May inclusive, 130 cases have occurred in Los Angeles County and 205 in the City. Orange County comes next with 18 cases, while San Francisco, the largest city in the state, has only had 11. Altogether, there have been 432 cases as follows: January, 25; February, 26; March, 18; April, 36; and May, 327—a total of 432. The jump in May has been something tremendous.

It is needless to add that the situation has caused alarm in other parts and cities of the state, and health officers everywhere are watching the situation and taking every precaution to prevent the spread of the disease.

Nearly 82 per cent of the cases have occurred between the ages 1 and 14, inclusive, the greatest incidence falling between 5 and 9. After the age 14 there is a rapid diminution in the incidence, and those above 35 are practically immune, judging from the figures.

Unfortunately, poliomyelitis still has many secrets which earnest workers all over the world are endeavoring to penetrate, so far without entire success.

While one attack produces lifelong immunity as a rule, the production of artificial immunity is far from having reached a satisfactory and practical state.

In the New York epidemic of 1931, more than 400 control cases were compared with 500 cases who received a serum believed to contain virus-neutralizing substances. The results showed no advantage in favor of the serum treated cases. A similar result was obtained in 1932 by Kramer and Aycock on a smaller number of cases. The serum of those who have recovered from the disease contains a virus-neutralizing substance, and this is true for the majority of adults in urban populations. Prevention has been attempted by the injection of 10–20 c.c. of convalescent serum or parental whole blood, with apparently good results. However, the same report shows that of 2,200 persons not treated, only 31 developed the disease. On the authority of Park, it may be stated that no safe and reliable method of active immunization in man has been found. Different methods have been successful in monkeys, but none has proved sufficiently safe and effective to warrant its application to man.

A SAD MILESTONE IN SANITARY ENGINEERING PROGRESS

IN almost every era of real progress in civilization a few individuals are born who carry on the major activities which distinguish that era. Such an individual, during the advance of sanitary engineering practice in the past 50 years, was George W. Fuller. His death on June 15, 1934, in New York City, at the age of 65, marks the passing of one who had probably more to do with the technical development and the public stimulation in the installation of municipal sanitary devices than almost any man in this country.

Of ancient English ancestry, he was born at Franklin, Mass., a state which has given to this country a long line of distinguished sanitarians. By heredity and by training he was equipped to perform a timely task in the sanitary field.

George W. Fuller

Educated at the Massachusetts Institute of Technology, he supplemented his training at the University of Berlin and in the private office of Piefke, engineer of the Berlin Water Works. For 5 years thereafter, he had the advantage of contact with some of the most distinguished sanitary leaders in this country at the Massachusetts State Board of Health and at the Lawrence Experiment station.

Beginning in 1895, he conducted the important water filtration experiments at Louisville and later at Cincinnati. The results of these studies established many of the basic principles adopted in the treatment of water supply from that day to this. During the World War he was a member of a sanitary committee at Washington regulating the engineering planning and sanitation of the various Army

camps in this country. As consulting engineer to the U. S. Public Health Service and to the Construction Division of the Army, he was responsible for a considerable part of the practices which resulted in the unprecedented low typhoid fever death rate in the Army camps.

He was professionally and intimately engaged for many years in developing programs for sewerage and water supply systems for the Sanitary District of Chicago, New York City, and over 150 large cities in this country and abroad. He was almost as well known in England, Germany, France, and the Far East as in this country.

In American Public Health Association affairs, he was one of the initiators of and contributed largely to the development and widespread adoption of the Standard Methods of Analyses for Water and Sewage, sponsored by the A.P.H.A. He was probably more responsible than any other individual for the successful publication of the *Manual of Water Works Practice* by the American Water Works Association. The list of society activities with which he was identified is so long that it can hardly be repeated here. He was distinguished, however, for the fact that his interests were not only administrative during his entire lifetime, but that he was closely identified with and always highly stimulated by the desire to develop new technical processes and improvements in existing practice. In the American Public Health Association he had a long career of active participation. In 1914 he was Vice-Chairman of the Sanitary Engineering Section; in 1915, its Chairman; in 1924 an elective councillor; in 1925 and 1926, a member of the Executive Board; in 1927 to 1929, a member of the Governing Council; in 1927 to 1928, Vice-President; 1928 to 1929, President, and in 1933 an Elective Councillor for 2 years.

He was past Vice-President and Director of the American Society of Civil Engineers, Past President of the American Water Works Association, and a member of most of the important technical societies in this country and abroad. At the time of his death he was Chairman of the Engineering Foundation, a research organization of the national engineering societies.

In the midst of his busy existence he produced many valuable articles and three books: *Water Purification at Louisville, Sewage Disposal,* and *Solving Sewage Problems,* each of them milestones in the development of sanitary engineering practice in this country.

His loss to the public health profession in enthusiasm, in professional judgment, and in technical wisdom is irremediable.

PUBLIC HEALTH EDUCATION*

IF YOU ARE SO FORTUNATE

as to live west of the Mississippi, and particularly if you live in a mountain or coast state, we hope that you will agree that an unusual opportunity is offered in holding the annual meeting of the A.P.H.A. in Pasadena.

IF YOU ARE HEALTH OFFICER OR ASSOCIATION EXECUTIVE

we hope that you will make every effort to facilitate the presence at Pasadena of any and every member of your staff who has anything to do with planning, preparing, writing, distributing health education material.

IF YOU DO ANYTHING IN HEALTH EDUCATION

planning or preparing material, or doing clerical or mechanical jobs, we hope that train, bus or flivver will bring you to Pasadena.

Wrong Again!—"I note with fiendish glee," writes Dr. W. W. Bauer, "two errors in a single paragraph" in this department under "Education and Reference" in the June, 1934, issue, page 655.

To begin with, I note a most startling title assigned to one of Thurman Rice's sex education pamphlets, to wit. "High Life Goes On and On, For Girls of High School Age." Perhaps it does, but not in the Rice pamphlets. Will you please undo this aspersion on the younger generation? The correct title is "*How* Life Goes On and On."

Will you also kindly correct the statement that individual pamphlets, priced at 25 cents each, cost $2.00 per set. The correct price per set is $1.00.

Of course we know that Dr. Bauer is director of Bureau of Health and Public Instruction, American Medical Association, 535 N. Dearborn St., Chicago, Ill.

School Health Education Institute—Elsewhere appears a detailed announcement of the Health Education Institute to be held at Pasadena, this year to be devoted to school health education.

We Salute Colombia!—We are delighted to receive a copy of *Salud Y Sanidad*, a publication of Departmento Nacional De Higiene Para La Vulgarizacion Y Propaganda De La Higiene Publica Y Privada, at Bogota. Two cover pages with illustrations in color, and a number of sketches with a touch of humor to make them appealing. We hope that Director Ricardo Bonilla will send copies of his health education material to Pasadena.

Who Will Get the Most at Pasadena?—They will get the most ideas for home use, and the best hunches to try out in their own work who go to Pasadena prepared to squeeze the most from the opportunity.

How about making a list of what you would like to learn?

Could you officially canvass the entire staff for questions to be answered and information to be sought?

Hold a staff meeting to discuss the most important questions on which your

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

department or association wants light?

If, as we hope, several staff members will go to Pasadena could you allocate the questions, placing responsibility for getting what is wanted?

Could you decide in advance upon some of the specialists and other individuals who could be consulted?

Could you select certain meetings in which your questions could be asked in the discussion period?

And, of course, it is to be hoped that you will check over your experiences and your successes, or failures, to decide on what *you* will tell to those you meet and what *you* will bring up in certain appropriate sessions of the convention.

All of the above applies as well to all phases of public health and of public health activities.

"Things to Forget"—In "a debunking of some of the good old traditions—based on scientific fact," Dr. W. E. Forsythe says:

> Hygiene has been spoken of as the yellow dog in the curriculum pack. There is more truth in the statement than in many ideas which have been promoted as hygiene. Too much of the traditional subject matter of hygiene has rested upon unscientific data. Many personal opinions, half truths, and uncontrolled observations have failed to survive immersions in scientific criticism. Such scrutiny promises well for the future of hygiene, which subject is probably not alone in needing "debunking."
>
> Oracular emanations seem never to be recalled. High sources of dogmatism occasionally should reverse the current, retract former deliveries, admit error, and tell us which of former teachings to forget. Certainly much that has been taught as valid hygiene is now recognized as unhygienic, useless, or of doubtful value, and should be forgotten. There are so many worth-while things to be learned about health that no time should be wasted on that which present-day science does not support.

Followed by debunked samples in *Journal*, National Education Assn., June, 1934, Washington, D. C., and *Journal of Health and Physical Education*, March, 1934.

Colloquial Health Teaching—Effective health teaching is done in Jamaica through local types speaking in vernacular. In "A New Way to Treat An Old Disease," we are told of an observation visit to the Kingston Dispensary by Aunt Eliza Bush-Tea. Dead "set against the doctors and their scientific methods" in the diagnosis and treatment of tuberculosis, Aunt Eliza protested that

> "Dem doan' know to use Nature's remedies. The Lawd mek 'erbs grow far every ailment He set on mankine. Wat de sense of dese injections and 'ospitals and dem tings. Ef 'im meant fa mans to hab dose t'ings why 'E doan' say so in de Good Book?"
>
> "But Aunt Eliza," Retinella had replied, "why can't we make progress in medicine as well as other things? Look at the development of motor cars and airplanes; you old people didn't dream of them when you were young. Many of the modern inventions have been applied to medical problems, helping the advance of treatment immensely."

The common sense argument won Aunt Eliza whose visit is reported in detail in *Jamaica Public Health*, Kingston, June, 1934.

Bring One Hundred Address Cards—We think you will have use at Pasadena for nearly if not all of a hundred address cards or 3 by 5 inch slips on which have been typewritten your name and full address. (It is surprising how many address cards do not carry the name of the city.)

You will hasten acquaintanceship and facilitate the exchange of ideas and information by offering your card.

And you will use quite a number of the cards at the luncheon discussion-demonstration session of education and publicity helps.

And you will use quite a number of the cards when you examine the displays at "Education and Publicity" headquarters and wish to receive free

copies of many items which will be shown there.

"We Tell the Truth"—A "Public Health Column" has been started for the newspapers of the state by the New Mexico Bureau of Public Health. In a recent issue Dr. Earp said:

> It is our intention in this column always to tell the truth. We make mistakes no doubt. Whenever we discover them or they are pointed out to us we shall attempt to correct them. But we do not intend to suppress the truth, because we do not believe that it is in the public interest to do so. Health departments have before now kept quiet about poor health conditions in the fancied interest of a trade with tourists or other visitors. The people suffer and in the long run even the tourist trade suffers from such a policy. Nothing encourages visitors to a health resort so much as to know that there is a health department on the job on whom they can rely for a truthful report.

Many Methods and Many Needs—Opportunities for reaching the people are considerably more varied and more numerous in the smaller cities than in the larger ones, in proportion to the population.

The possibilities for the use of diverse methods and materials are much greater in the smaller than in the larger cities.

The resources which can be found and may be used largely increase as the population decreases from that of the greater to the lesser cities.

Much of this sort of material will be brought up in the discussion-demonstration luncheon of the Public Health Education Section at Pasadena. (Be sure to have plenty of address cards for use at this luncheon meeting.)

Easier Steps Are the Best First Steps—An obvious strategy for cancer education is suggested in *Bulletin* of American Society for the Control of Cancer, 1250 6th Ave., New York, N. Y., June, 1934. Under "Accessibility and Cancer Education":

> Among the various types of cancer there exist very different degrees of accessibility. This fact has an extremely important bearing on the success of any educational campaign concerning their detection and treatment.
>
> Inasmuch as cancer of the skin occurs more frequently on exposed areas such as the face or hands it is obviously a relatively easy type to detect in its early stages. It is also easy to reach for any selected type of treatment. We may therefore expect that as educational work progresses the death rate from skin cancer may be materially lowered.
>
> To some degree these arguments apply also to cancer of the mouth, tongue, or lip. In the two former types, however, the patient himself must be held responsible for reporting suspicious symptoms as soon as they are recognized.
>
> Nodules which may be early cancer of the breast can be easily detected by any woman who is intelligent and enlightened enough to adopt the habit of periodically examining her own breast tissue. The word "enlightened" in this instance has a very important connotation. It refers to the unfortunate prudishness which makes some women loath to take an intelligent and impersonal interest in the well-being of their own bodies. This factor is of far more importance among those born before the twentieth or late nineteenth century than it is in those who belong to the younger generation. The latter, thanks to increasing sanity and frankness in dealing with questions of human physiology, are not subject to stupid taboo as are their elders.
>
> This fact is perhaps the greatest single cause for optimism concerning the eventual control of uterine cancer. Only those who understand the difference between normal and abnormal manifestations of uterine activity can be expected to recognize and report the latter for immediate examination and diagnosis. Granted, however, that women in increasing numbers adopt a modern and healthy attitude toward the hygiene of the reproductive organs, the chances of improving the situation as regards mortality from uterine cancer is good.
>
> Much remains to be done for handling other forms of cancer among all classes.
>
> In the meantime, public education had probably better place its major emphasis on cancer which occurs in more accessible locations. In the case of cancer of the skin, lip, tongue, and mouth, the educational material and methods can be simple and direct. In dealing with cancer of the breast and uterus, the influence of the intimate site of the cancer must be considered.

If and when progress in the control of different types has been made we shall have powerful and convincing arguments with which to create public support for the more costly and difficult campaign against internal manifestations of this disease.

Please Do Us a Favor—The editor of this department of the *Journal* solicits the privilege of personally meeting every member of the Public Health Education Section who will be at Pasadena, and every health worker who is concerned with or interested in health education.

Please double the favor by mentioning your name and your connection, if possible presenting a copy of your address card.

We thank you in advance.

What They Want to Know—An editorial in *Hygeia*, May, 1934, on "Health Questions and Answers" discusses the 4,500 letters addressed to *Hygeia* asking questions about health.

Most letters asked more than one question, the average being about 136 questions for each one hundred letters. One letter out of every ten asked, either exclusively or in addition to other questions, about books dealing with health subjects. Questions about books, in fact, led the list of subjects. This was true also in 1932. Next in order of interest, occurring in the proportion of one letter out of every fifteen, were questions about food and diet, while questions about the hair and the scalp came next; these were found in one letter out of eighteen. These two subjects virtually shared second place in 1932, occurring then in one letter out of fifteen.

Other subjects in order of interest related to the bones and joints, mainly arthritis and rheumatism; "beauty" questions; sex, not including birth control or diseases of the reproductive organs; drugs; allergy or sensitization, of interest to hay fever and other sufferers; physical therapy; diseases peculiar to women; and on up to a total of 25 subjects.

Most interesting is the shift in order of interest as detailed in this 2-page editorial. In 1932 drugs occupied 25th place; maternal and infant death was in 7th place, dropping to 18th place in 1933; and so on. Our guess is that the range of subjects treated in *Hygeia* and the nature of the articles had some influence on the changed ranking in the classification of the replies.

Hygeia's correspondence covers the entire United States from coast to coast. The letters originate in homes of all characters; they come from writers with a liberal education as well as from those with almost none. A good general education does not seem to carry with it any guarantee of wisdom in health matters.

The letters prove that America is health-conscious, but they prove also that much remains to be accomplished before America can be said to be intelligently health-conscious. The emphasis on personal appearance, evidenced by the prevalence of questions about hair, scalp and "beauty," as compared to the apparent apathy toward real health problems, which is shown by the infrequency of questions on the more important topics, proves that health instruction on the more important topics, proves that health instruction is a big and important job.

Health Education in the Journal—To facilitate future reference to mentions of health education we plan to record here what has been published on the subject in previous issues of the *Journal*.

In the June, 1934, issue see two references to education in the editorial on "The Medical Examination of Food Handlers."

The same issue includes:

"Organization of Adult Groups for Health Education," by Mary P. Connolly.

"A Plan to Increase Understanding of Scientific Medicine," by T. J. Edmonds.

Your Headquarters at Pasadena—Please make full use of "Education and Publicity" headquarters in the Municipal Auditorium at Pasadena.

Meet your friends there.

Come there as often as possible to examine the display.

Bring there your questions and your problems.

Be there to share your ideas and experiences with others.

Leave your address cards for mailing to your home addresses numerous useful samples and valuable helps. (*Be sure to learn just how this is done.*)

Have plenty of address cards to hand to those you meet so that they will get clearly who you are and what you do, and may note on the card what they promise to send to you.

EDUCATION AND INFORMATION

"The Care of the Child from One to Six," a selected list of references. *Child Health Bulletin,* 50 W. 50th St., New York, N. Y. May, 1934.

"The Control and Treatment of Cardiac Cases Occurring in School Children," by Dr. W. P. Brown, State Education Dept., Albany, N. Y. 2-page reprint. *Free.*

"Depression Makes Health Inroads" is a letter-size handbill issued by Los Angeles Community Chest.

"The Doctor's Office as a Health Center" is the April, 1934, issue of *Tuberculosis Abstracts,* available through any tuberculosis association. Describes the coöperative plan in Detroit.

"Doctor, What Toothpaste and Mouth Wash Do You Recommend?" leads up to the suggestion of common salt, or precipitated chalk and castile soap. *Health Bulletin,* North Carolina State Board of Health, Raleigh. May, 1934.

"Enjoy Health and Happiness at Dayton's Recreational Centers This Summer" is a large, folded broadside issued by Dayton, Ohio, Council of Social Agencies. Inside is a "treasure map" with a key to locate summer opportunities.

"Health: Diseases, Drugs and Sanitation." Superintendent of Documents, Washington, D. C. *Free.* A classified list of federal government publications.

"Health," Ontario's annual health almanac for 1934, drops all calendar features, continuing the varied miscellany of personal and community health material. "The contents are designed to meet the many inquiries from people throughout the Province." Illustrated; 104 pages. The 1934 edition ran to 80,000 copies. Ontario Dept. of Health, Toronto, Ont.

"Present Guides for Household Buying," a handbook of sources of information which should be useful to hospitals, sanatoria, etc., in making the most of the budget. Ask Department of Agriculture, Washington, D. C., for a copy.

"School Lunches," with recipes to serve 50 children. Bureau of Home Economics, Washington, D. C., 13 pages. *Free.*

The Bureau of Nutrition and Health Education, University of Texas, Austin, offers

. . . a set of 8 colorful posters known as the Every Day Health Series, prepared for use in illustrating lessons on health habits. Each poster has an atmosphere of happiness and action.

"Every Day," at the top is followed by such statements as "Play out of doors," "I drink milk," "I brush my teeth," together with a silhouetted picture.

They are 12 inches high, 17 inches long. Set for *45 cents; 55 cents* outside of Texas.

The following have been issued by State Dept. of Health, Albany, N. Y.:

"Every Child Needs Cod Liver Oil." 1 page.

"Milk: A Gilt Edge Investment." 4 pages.

"Constipation." 4 pages.

"The Public Health Nurse and the Work She Does." 11 pages.

"The Division of Laboratories and Research." History and present status; 81 pages; many illustrations; 6 large folded floor plans.

"Protection Against Diphtheria." 4 pages. Factual statements in every day language.

Four reprints from *Hygeia,* American Medical Assn., 535 N. Dearborn St., Chicago, Ill.:

"Cancer: Its Status Today." 8 pages. *10 cents.*

"A Child Is To Be Born." 45 pages. *15 cents.*

"Feminine Beautification." How—from Cleopatra to Greta Garbo. 11 large pages. *10 cents.*

"The Child Who Stutters," by F. B. Brown. 22 pages. Bibliography. *10 cents.*

"An Index of Nutritional Status," "Vitamin D Milk," and "The Flavor of Milk" make up recent issues of *National Dairy Council Digest*, Chicago, Ill. *Free.*

Three summer bulletin board posters are offered by Employer's Mutuals, Wausau, Wis.: on poison ivy, prone resuscitation, and first aid for sunstroke or heat prostration. *Free.*

"Your Child and the School," by Dr. A. G. Ireland, director of physical and health education, New Jersey State Dept. of Public Instruction. Health News Service, 22 E. 40th St., New York, N. Y. Brief 175-word statements for newspaper use on "Summer visiting," "Summer mishaps," etc. *Free.*

IDEAS AND INFORMATION

About lettering for posters or displays, says *Michigan Public Health*, Lansing (April, 1934):

> Letters should never be so unusual or fantastic as to divert the attention of the reader from the thought itself. Tilted devices or ornamental letters often obstruct the thought. Originality is to be commended and is fine if not carried too far. As a general rule, letters should have height and width but not thickness. Giving a third dimension to a letter calls attention to the letter itself and hinders the thought from being clearly given. There is flexibility about all letters and we can vary them by making them heavy or light, large or small but never distorted.
>
> Mere size does not increase the legibility or the drawing power of a letter. A small letter well placed and not crowded will attract more attention and can be seen farther than a large letter crowded into a small space.

A short story contest has been announced by *Journal of the Outdoor Life*, 50 W. 50th St., New York, N. Y. The Christmas Seal must enter the story, but need not dominate it. Details in the May, 1934, issue.

"Classes for Prospective Fathers," by E. V. Thiehoff, M.D. *Public Health Nursing*, 50 W. 50th St., New York, N. Y. Dec., 1933. "Something new for Cleveland in prenatal instruction."

Again *Syracuse Herald*, Syracuse, N. Y., has issued a tabloid magazine section devoted to "Our Babies," with numerous articles, signed and unsigned.

The Child Health Day tabloid supplement of *Honolulu Star-Bulletin* was matched by *Nippu Jiji*, a Japanese paper. Of the latter supplement says James G. Stone, Tuberculosis Assn. of Hawaii:

> This is the first health supplement ever issued by a foreign language paper in Hawaii, and I am wondering whether it is the first foreign language child health supplement issued in the United States. At any rate, we will claim that it is until somebody disproves our contention.

An effective example of a brief for a special proposition has been prepared by the Committee on 8 Hours for Nurses, 132 East 45th St., New York, N. Y. A light green cover, with contents; 6 mimeographed pages of text; an off-set page reproducing "A Few Recent Headlines Reflecting Public Interest." A folder enclosure, and a leaflet of suggestions for workers are both well-written and attractively printed. Send *10 cents* for samples.

MAGAZINE ARTICLES

Offered as source material; some deserve commendatory letters to editors.

"A Reporter at Large: The Surgeon," by Morris Markey. *New Yorker*, 25 W. 45th St., New York, N. Y. Feb. 3, 1934. *15 cents.* Visit to a hospital operating room; convincing tribute to the care, skill and attitude of surgeons and nurses; an example of

high grade reporting; should be useful where there is unfounded criticism of a hospital.

"Back to the Midwife?" by H. H. Smith. *New Republic,* 421 W. 21st St., New York, N. Y. July 4, 1934. *15 cents.* Questions as to the place of the midwife.

"Milk: Its Story from Farm to Town," by H. Ripperger. *New York Times Magazine.* June 10, 1934.

"My Daughter and I," by O. Rutter. *Rotarian,* Chicago, Ill. April, 1934. "A dad who wants his girl to grow up with eyes wide open."

"Mysteries and Medicals," by O. Fergerson. *New Republic,* 421 W. 21st St., New York, N. Y. July 4, 1934. *15 cents.* Brief review of recent Hollywood output built around physicians.

"Paying for Health," by C. P. Streetor. *Farmer's Wife,* St. Paul, Minn. Sample *free.* How a Michigan county found that it could not afford to do without a county health unit.

"The Potato Defies the Dietician," by H. Ripperger. *New York Times Magazine.* May 13, 1934.

"Social Work in Hospitals," by H. M. Bartlett. *Junior League Magazine,* 305 Park Ave., New York, N. Y. June, 1934. *30 cents.*

PUBLIC HEALTH BULLETINS

"Bulletins" or "house organs" issued by many health agencies represent a surprising range of interest or lack of interest in the readers.

Now may well be the time for all good editors to review the past year's out-put, seeking to determine what changes might be introduced next fall.

The following with an additional paragraph is the Fourth of July message of the Middletown, N. Y., *Bulletin:*

> When the fireworks begin to shoot, remember this story. General Leonard Wood recovered from a severe gunshot wound inflicted when a mortar shell burst inside a gun, exploding it. But his small grandson died from tetanus resulting from a wound produced by a toy pistol. It isn't the size of the firearm or of the injury which tells the story.

In "Facts and Health" Dr. Dowling gives 3 pages to an effective presentation of the values of a local health survey. *Birmingham's Health,* Jefferson Co. Board of Health. June, 1934.

"A Philosopher Looks at Health," quoting from Thomas Carlyle, is an example of usable material to be gleaned from the library. In *Weekly Bulletin,* California Department of Health, Sacramento. March 17, 1934.

Two pages of quotations from newspaper editorials appear in *State Board of Health Bulletin,* Madison, Wis. The editors say some of the things the State Board likes to tell its readers.

"What Is Your Answer?" is a page of questions in *Understanding the Child,* Massachusetts Society for Mental Hygiene, 3 Joy St., Boston, Mass. *15 cents.* Numbers indicate pages where the answer may be found to confirm the reader's answers.

Michigan Out-of-Doors is now *Health,* issued monthly by Michigan Tuberculosis Assn., Lansing.

Monthly Bulletin, Indiana Division of Public Health, Indianapolis, has been revived under the editorship of Dr. Thurman B. Rice.

Bulletins are issued now by the Greater Vancouver Health League and the Provincial Sanatorium at Charlottetown.

BOOKS AND REPORTS

Japanese Medicine, *Vol. XII of "Clio Medica" Series—By Y. Fujikawa, M.D. Translated from the German by John Ruhrah, M.D. New York: Hoeber,* 1934. 114 pp. Price, $1.50.

This belongs to the series of handbooks published under the general title "Clio Medica," edited by E. B. Krumbhaar, M.D.

The author divides the subject according to the ten political periods, beginning with the mythical period, which includes all Japanese history prior to 96 B.C., and ending with the present reign of the Meiji family who came on the Imperial throne in 1868. The book is another revelation of the fact that the Japanese are not originators but borrowers of great adaptability.

Medicine was probably first introduced into Japan from Korea which had long practised Chinese medicine. Deeply impressed, the Japanese sent students to study Chinese medicine at its source. For the first 1500 years of the present era Japanese practitioners depended largely upon the Chinese for their methods and inspiration. In the 6th century Buddhism was introduced into Japan from Korea and China and rapidly came into national favor. This tremendously stimulated Japanese interest in the Chinese medicine of that day because the Buddhist missionary priests from the mainland were generally physicians as well. In time Buddhist priests in Japan came to have an influence in their own country comparable to that of the Christian monks in Europe in the Middle Ages. In their treatment of disease they naturally laid more stress on prayer than on medicine. "When great epidemics appeared it was customary to appease the plague demons with prayers and incantations. But smallpox patients were driven out of their homes and treated in isolation houses."

In a chronological table, the author frequently refers to national epidemics of various kinds. In 1512 A.D., he speaks of an epidemic skin eruption which came either from China or the Loochoo Islands, and which the author considers was the introduction of syphilis into Japan. He also refers to several febrile epidemics in the 18th century which he implies were influenza.

European medicine was introduced into Japan in 1556 by a Jesuit medical missionary from Portugal. For the next 300 years Western medicine was successively banned and reintroduced. Sometimes all was banned except surgery which was always accepted as superior to internal medicine from Europe. Following the Portuguese came Dutch, and soon after German physicians. As Western medicine came in the influence of Chinese medicine steadily waned, but again and again the latter would recrudesce, as Western medicine was for periods ostracized together with its handmaiden, Christianity.

Immediately after the opening of Japanese ports to foreign trade, following Admiral Perry's display of the American fleet in the port of Yedo in 1854, and the subsequent civil war which brought in the rule of the Meiji family in 1868, Western medicine, along with Western arts of war, was officially recognized. The government sent commissioners to Europe and America to study everything. One result was that the German language was officially adopted as the medium of instruction for most higher learning, including medicine. Japanese students were sent

to Germany, and many German physicians and scientists were brought to Japan to teach medicine and the premedical sciences.

The reviewer, who frequently visited Japan from 1910 to 1927, would hardly agree with the author of the last chapter, that the "Government has placed medical education on an equal footing with that of other countries." It is true that Japan has emerged from antiquated medicine and has adopted scientific medicine of the West in a remarkably short space of time, but her best medical schools and hospitals are not yet comparable to our best. The encouraging phase is that steady progress is being made and that her scientific men are more and more making important contributions.

The author states than Japan has 27 medical schools, of which 15 are classified as imperial in rank, more than 1,000 hospitals and over 50,000 physicians. Some 50 medical journals are published, the majority in the Japanese language, but several in German. This use of the German language rather than English has obviously tended "to make the English-speaking world overlook many meritorious works done in Japan."

HARVEY J. HOWARD

The Biology of Bacteria: An Introduction to General Microbiology—*By Arthur T. Henrici, M.D. New York: D. C. Heath and Company,* 1934. 482 pp. Price, $3.60.

This book is the outcome of the successful teaching of various phases of bacteriology by the author over a number of years. It is a most interesting and accurate presentation of the subject in which various ramifications of the science are indicated. Without going into detail, controversial questions are suggested to the student and the known facts concerning these questions are presented. An attempt is made to interest the student in the history of bacteriology by using a style similar to that of de Kruif in "Microbe Hunters."

An unusually clear discussion of optics, including the use of the dark field condenser, is given in one of the earlier chapters. Apparently a slip, such as is often found in first editions, has occurred on page 33 in the use of the terms "acid side" and "basic side" of the isoelectric point. This gives rise to an incorrect statement of the nature of the charge on an amphoteric substance.

The relationship of bacteria to other organisms is considered in sections dealing with protozoa, algae, fungi, and ultramicrobes. Technical methods are given in detail as need for their use arises rather than in a special section. A chapter dealing with heredity and variations of bacteria is very opportune in view of the literature which has recently accumulated on this subject. The truly scientific aspects of bacteriology are discussed in sufficient detail for the needs of the beginning student.

Sections on molds, protozoa and virus diseases complete the book. It contains a number of well selected, and for the most part, original, illustrations. The style and make-up of the text are excellent. The volume is unusually free from errors of any sort.

This is not just another textbook on general bacteriology, but a different one. It is suitable for students in general bacteriology regardless of the field of the science in which they may expect to specialize.

NEWELL R. ZIEGLER

Jimmy Chew—*By Harrison W. Ferguson, D.D.S. Chicago: Issued by Good Teeth Council for Children,* 1934. 31 pp. Paper.

This little booklet explains, under the four headings of "Right Food"" "Chewing Exercise," "Tooth Brush,"

and "Your Dentist," the fundamentals of tooth development and care. It is intended for young children and should attract their interest by its simplicity and numerous illustrations.

Good Teeth Council is the latest addition to the group of organizations with an educational purpose and a commercial background. There is in "Jimmy Chew," however, only one casual reference to chewing gum with which only the most ardent sticklers for æsthetics could find any fault.

A foreword explains that the booklet has the approval of educators, health workers, nutritionists, and the dental profession. For free copies, communicate with Good Teeth Council for Children, 400 North Michigan Boulevard, Chicago. JOHN HALL

Health Workbook for College Freshmen—*By Kathleen Wilkinson Wootten. Published by the Author, Milledgeville, Ga.* (2d ed.), 1934. 214 pp. Price, $1.50.

This text or workbook is designed as "An Orientation course in personal, home, and community hygiene."

Its introduction discusses several important factors relating to the health education program such as the qualifications of the teacher, health supervision of college students, correlation of various college departments to secure better student health, suggestions to the teacher of freshman hygiene, and the integration of freshman health and physical education courses.

Each of the 47 chapters is an outline covering the content to be noted, activities to be used in study, prevention, or correction. Each chapter is concluded with a generous bibliography on the topic concerned. More specific references, *i.e.*, giving title of chapter, would save the student much time, and make his study more gratifying and profitable.

A general bibliography following the group of lessons, together with a list of sources, organizations, and magazines from which material may be secured, gives added value.

This text is a radical departure from the usual college textbook of hygiene, and conforms more nearly to the modern concept of college teaching.

CHARLES H. KEENE

Studies on the Possible Intoxicating Action of 3.2 Per Cent Beer—*By A. J. Carlson, N. Kleitman, et al. Chicago: University of Chicago Press,* 1934. Price, $.75.

These experiments, undertaken to study the possible intoxicating effects of 3.2 per cent beer on man, were in part financed by a grant from the U. S. Brewers Association to the University of Chicago.

Three measurements were made—(1) alcohol concentration in blood and urine; (2) objective performance tests; and (3) subjective judgments of change in behavior of the subjects by observers. Sixty-three pages are given to descriptions of the experimental work, with illustrations and tables. For the average reader the Discussion and Summary will be found the most useful part of the report.

It is well known that many definitions of drunkenness have been given from its social, legal, and physiological aspects. The report of the Alcohol Investigation Committee of the British Medical Research Council on this point is quoted and discussed, also the discussion of the Committee of the Judiciary, U. S. Senate.

The writers of this report point out that a number of things may bring about in certain people some of the changes which have been attributed to alcohol, and that certain people, without taking any alcohol, commit misdemeanors, indiscretions, and crimes which others are guilty of only when under the influence of liquor. They

believe that the concentration of alcohol in the blood seems to be one of the most reliable of the objective criteria of intoxication.

The Summary gives a résumé of the 7 types of experiment carried out, in which some 113 subjects participated, beer being given to some in very moderate amounts and at well spaced intervals, while for others there was forced drinking every 30 minutes for 8 consecutive hours.

The conclusion is based on the Senate Committee's definition of an intoxicating beverage, and the writers decide that "beer containing 3.2 per cent alcohol by weight is not an intoxicating beverage."

The report is lucidly written and the auspices under which the work was done assure one of its authenticity.

MAZÝCK P. RAVENEL

Maternal Mortality and Morbidity —*By J. M. Munro Kerr, M.D., F.R.F.P.S. (Glas.), F.C.O.G. Baltimore: Wood,* 1933. 382 pp. Price, $8.25. (Made and printed in Great Britain.)

This is the most complete and exhaustive study of maternal mortality and morbidity that has come to my attention. While the material is drawn largely from England, Scotland, and Wales, the basic factors are comparable with those found in the United States. At the end of an illuminating introduction, Dr. Kerr states:

> . . . it emerges from the inquiries which the following pages summarize that puerperal mortality and morbidity in this country can be reduced by a figure which, on a conservative computation, may be stated at not less than 40 per cent, *but only if the essentials already stated are complied with.*
>
> A satisfactory maternity service for the country can be created without disturbing existing conditions to any great extent: no one engaged in obstetric practice need have his position prejudiced.

The volume is divided into 5 main parts, the first setting forth in detail all of the causes, direct and indirect, which affect puerperal mortality. A chapter on maternal morbidity and subsequent disablement by Dr. Donald McIntyre and one on neonatal death and disablement by Prof. Geoffrey B. Fleming are especially informative.

Part II deals entirely with prevention, both in its antenatal aspects and in the suitable management of labor. These two chapters form the core of the book and are replete with practical suggestions for the prenatal care of both healthy women and women with inter-current diseases. Conservative aseptic obstetrics is urged. Radiography is recommended as a method of examinations which may be of the greatest value in diagnosis of obscure conditions during pregnancy. Six interesting radiographs are given to illustrate this section.

Part III takes up in 7 chapters the various services available, such as domiciliary service, hospitals, prenatal clinics, midwifery service, and transport service. A whole chapter is devoted to the education of medical students in obstetrics and gynecology.

In Part IV, Dr. Kerr presents his scheme of organization for a national maternity service. "This scheme presumes the establishment of a national maternity service based on the insurance principle." It is recommended that there be a Central Directing Board associated with the Ministry of Health for England and Wales and the Department of Health for Scotland. While this service is designed primarily for the artisan class, largely of insured persons, and for the poor and destitute, its provisions are so broad that it will affect the whole obstetric practice. This scheme is compared with three others which have been under consideration recently.

The whole volume will bear careful study in view of recent investigations

of a similar nature in the United States and elsewhere. The book is well presented and conveniently arranged for reference. RICHARD A. BOLT

Modern Sewage Treatment—*By T. P. Francis. London: The Contractor's Record, Ltd.*, 1932. 322 pp. Price, $7.50.

This is a broad but somewhat brief outline of sewage treatment developed by the author in a most attractive and instructive manner. The fundamentals in the treatment of any sewage are emphasized and the book developed around these fundamentals. I believe it is one of the best introductions to the problems of sewage treatment I have ever read and for that reason would recommend it highly for students or for sanitary engineers who are broadly interested but perhaps not actually operating or engaged in the designing of plants.

To those who are more intimately connected with the operation or design of plants, and especially to young engineers, it would be valuable as a reference book for the fundamentals, if supplemented by other books or current literature which would go further into the details of the specific problems concerned.

An appendix of 68 pages covers outlines of: (1) Sewage chemistry, (2) Hydrogen Ion concentration, (3) Theory of colloids, (4) Application of colloidal phenomena, (5) An outline of biology.

The book has many excellent sketches, drawings and pictures, in fact, about half of the book is composed of illustrations.

ALFRED H. FLETCHER

BOOKS RECEIVED

MEDICINE: A VOYAGE OF DISCOVERY. By Joseph Lobel. New York: Farrar & Rinehart, 1934. 334 pp. Price, $3.00.

THE SCIENCE OF WORK. By Morris S. Viteles. New York: Norton, 1934. 442 pp. Price, $4.00.

THAT HEART OF YOURS. By S. Calvin Smith. Philadelphia: Lippincott, 1934. 212 pp. Price, $2.00.

CHILDREN OF THE NEW DAY. By Katherine Glover and Evelyn Dewey. New York: Appleton-Century, 1934. 332 pp. Price, $2.25.

HYGIENE AND HOME NURSING. By Louisa C. Lippitt. Yonkers: World Book Co., 1934. 424 pp. Price, $1.24.

WORK RELIEF IN GERMANY. By Herta Kraus. New York: Russell Sage, 1934. 93 pp. Price, $.50.

INFLUENZA. Part II. By David Thomson and Robert Thomson. London: Bailliere, Tindall & Cox, 1934. 1557 pp. Price, $15.50.

MILITARY MEDICAL MANUAL. By the Military Surgeon. Washington: National Service Publishing Co., 1934. 774 pp. Price, $4.50.

THE ANCESTRY OF THE LONG-LIVED. By Raymond Pearl and Ruth DeWitt Pearl. Baltimore: Johns Hopkins Press, 1934. 168 pp. Price, $3.00.

KEEPING CAMPERS FIT. By Elena E. Williams. New York: Dutton, 1934. 227 pp. Price, $2.50.

THE PNEUMONOKONIOSES (SILICOSIS) BIBLIOGRAPHY AND LAWS. By George G. Davis, Ella M. Salmonsen and Joseph L. Earlywine. Chicago: Industrial Medicine, 1934. 482 pp. Price, $7.50.

DEATH RATES BY OCCUPATION. Edited by Jessamine S. Whitney. New York: National Tuberculosis Assn. 32 pp. Price, $1.00.

LEISURE-TIME INTERESTS AND ACTIVITIES OF BUSINESS GIRLS. A Research Study. By Janet Fowler Nelson. New York: Womans Press, 1934. 113 pp. Price, $.75.

MANUAL OF NURSERY SCHOOL PRACTICE. By Iowa Child Welfare Research Station. Iowa City: University of Iowa, 1934. 215 pp. Price, $1.00.

THE DANGEROUS AGE IN MEN. By Chester Tilton Stone. New York: Macmillan, 1934. 105 pp. Price, $1.75.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

The Little Fleas That Bite 'em—Phage plays a part in modifying the sensitivity of invading organisms to the destructive action of complement in each instance of invasion in which the diseased host produces antibodies. The experiments reported complete the fifteen-year-old study of the general behavior of phage.

D'HERELLE, F., and RAKIETEN, T. L. Mutations as Governing Bacterial Characters and Serologic Reactions. J. Infect. Dis. 54, 3:313 (May-June), 1934.

Testing Vitamin D Milk—A method is proposed for testing the potency of milk fortified with antirachitic vitamin. The importance of clinical experience to supplement laboratory studies is emphasized in a second paper reporting upon research along the lines of the proposal.

ELIOT, M. M., *et al.* Potency of Milks Fortified with Respect to Antirachitic Properties (and) Prevention of Rickets by Milk Fortified with Vitamin D from Cod Liver Oil. J.A.M.A. 102, 22:1823 (June 2), 1934.

Detecting Food Impurities—Some of the problems of the British analyst of foods and drugs are recounted in an interesting dissertation given over largely to milk, but including jam, that most important part of the British dietary.

EVANS, J. Recent Advances in Food Analysis. J. Roy. San. Inst. 54, 12:599 (June), 1934.

Infantile Paralysis Outbreak Studied—Convalescent serum is believed by the author to have been of value in the treatment of poliomyelitis cases in a Quebec epidemic occurring in 1932. Evidence of increased resistance due to nonspecific immunity support the earlier suggestions in regard to this phenomenon. Other findings of the study are recorded.

FOLEY, A. R. The 1932 Epidemic of Poliomyelitis in Quebec. Canad. Pub. H. J. 25, 6:260 (June), 1934.

Dangers to Granite Workers—Quarry drillers may be as dangerously exposed to granite dusts, and experience as high a tuberculosis death rate as do other pneumatic tool workers in cutting sheds. The dustiness in both occupations may be eliminated.

BLOOMFIELD, J. J., and DREESSEN, W. C. Silicosis Among Granite Quarriers. Pub. Health Rep. 49, 23:679 (June 8), 1934.

International Coöperation in Public Health—The broad subject indicated in the title is interestingly presented in a series of lectures which together should prove to be an invaluable historical document.

BUCHANAN, G. S. International Coöperation in Public Health. Lancet, 1, 17:879 (Apr. 28), 1934.

When to Revaccinate—Immunity conferred by a single vaccination usually lasts longer than the traditional 7 years. The protection lasts for 20 years in most individuals.

DEARING, W. P., and ROSENAU, M. J. Duration of Immunity following Vaccination against Smallpox. J.A.M.A. 102, 24:1998 (June 16), 1934.

Preventoriums?—Do preventoriums really prevent tuberculosis? A study of the results in 705 children cared for at a Boston preventorium shows that over a 10-year period only one child has died of tuberculosis and two cases developed. What would have happened had there been no care given, we can-

not know, but the surveyors of the project are convinced that it has been well worth while.

HAWES, J. B., *et al.* A Study of Ten Years' Work at the Prendergast Preventorium of the Boston Tuberculosis Association. New Eng. J. Med. 210, 25:1321 (June 21), 1934.

Cows, Not Pigs, the Offenders—Bovine type organisms of the abortus-meletensis group were responsible for the cases of undulant fever occurring in New York State. Most patients had no contact with cattle but drank raw milk.

GILBERT, R., and COLEMAN, M. B. Undulant Fever in New York State. J. Infect. Dis. 54, 3:305 (May-June), 1934.

When Eyes Need Help—All the information one would need about the incidence of eye refractions is available in this survey of 8,758 representative white families. Headache was the most frequent cause. A dozen other useful findings are recorded.

COLLINS, S. D. Frequency of Eye Refractions in 9,000 Families Based on Nation-wide Periodic Canvasses 1928–1931. Pub. Health Rep. 49, 22:649 (June 1), 1934.

Social Responsibility in the New Order of Things—Can we accomplish social planning under democratic leadership or shall it be forced upon us by a dictatorship? There is no other choice but chaos. Upon this postulate the author considers nursing, and finds that the nurse promises to meet the challenge of the new order. In some similar way to public health nursing, medical care must be provided. Health services must be expanded to meet the new concepts of social responsibility. Don't miss this dissertation.

WINSLOW, C.-E. A. The Challenge of Today. Pub. Health Nurs. 26, 6:283 (June), 1934.

Toxoid for Adults—Experience with medical students and nurses leads the authors to conclude that toxoid is a satisfactory immunizing agent for adults provided the described precautions are observed.

KELLER, A. E. and HARRIS, S. The Use of Diphtheria Toxoid in Immunization of Medical Students and Nurses. J.A.M.A. 102, 26: 2163 (June 30), 1934.

They Shall Not Die—Maternal mortality can be improved if we have the will to put preventive measures into effect. What these measures are is outlined in convincing detail.

KOSMAK, G. W. Community Responsibilities for Safeguarding Motherhood. Pub. Health Nurs. 26, 6:292 (June), 1934.

For Stylish Stouts—Milk and bananas are proposed as a basis for a satisfactory reducing diet, on the grounds of simplicity, low cost, ready availability, palatability, high satiety value, low salt content and demonstrated effectiveness.

HARROP, G. A. A Milk and Banana Diet for the Treatment of Obesity. J.A.M.A. 102, 24:2003 (June 16), 1934.

ASSOCIATION NEWS

THE HUNTINGTON LIBRARY AND ART GALLERY, PASADENA, CALIF.

THE HUNTINGTON LIBRARY AND ART GALLERY

WITHIN a period of 20 years Henry Edwards Huntington, a retired capitalist who had amassed a fortune in developing transportation systems, assembled an outstanding group of 18th century English paintings and a library of source material for the study of English and American culture that ranks with the best collections of its type in this country and in England. The panoramic view reproduced on this page gives an idea of the visitor's first impression—two stately buildings in a beautiful setting on the crest of a knoll on a 207 acre estate, which includes a 10 acre cactus garden, the Japanese garden, the rose garden, and collections of palms and cycads. The rarity of the plants draws many students of botany, including organized groups devoted to garden study and landscaping.

The deeds of trust created a self-perpetuating board of 5 trustees with the responsibility of administering the trust as a "free public research library, art gallery, museum, and botanical garden," whose object is the "advancement of learning, the arts and sciences, and to promote public welfare." An increasing number of scholars from English and American universities make use of the Huntington Library for its unique and rare material.

In the new wing of the Art Gallery one may see such famous masterpieces as The Blue Boy of Gainsborough, the portrait of Mrs. Siddons, the great English actress, The Tragic Muse, by Reynolds, and little Miss Sarah Moulton-Barrett, "Pinkie," by Lawrence.

Through the courtesy of the Huntington Library a special exhibit on Public Health in Tudor England will be shown to visitors at the Annual Meeting in Pasadena. This is scheduled for Tuesday afternoon, September 4. Rarely do public health workers have the opportunity to see on display the proclamations which were the origin of the development of our public health principles. The following article written by Sanford V. Larkey, M.D., will refer to some of the many items of interest which those engaged in public health work will find at the Huntington Library.

PUBLIC HEALTH IN TUDOR ENGLAND

SANFORD V. LARKEY, M.D.
Assistant Professor of Medical History, University of California
Huntington Library International Research Fellow

TO THOSE interested in the history of public health measures, 16th century England is particularly important, for during this century and in the early part of the 17th century, there developed those ideas of the state's direct concern with the health of its citizens which are the basis of our modern public health organization.

For an appreciation of the problem as it presented itself to the medical men of those days it is necessary to have some understanding of the knowledge of the time. It is the purpose of the exhibition of books and manuscripts at the Huntington Library to give this background, to indicate the part played by the government, and the origin of certain public health measures. In addition to the exhibition, "Medical Knowledge in Tudor England," there will also be shown various books and documents illustrating the actual practice of public health administration in Elizabeth's reign, and the extension of this in the time of James I. Included in this material will be proclamations—for control of the epidemics of plague, for improving housing conditions, pure food regulations, bills of mortality, hospital rules, and the official London Pharmacopoeia.

Naturally, the practice of medicine and the measures to combat disease were based on the theories then prevalent. These traditional beliefs are illustrated by a number of works on the subject, and from these one can get a good idea of what the Elizabethan doctor thought and how he practised his art. Great emphasis was put on the preventive aspects of medicine. Thomas Cogan, writing in 1584, says:

> The art of Phisicke . . . hath two principall partes: the one declaring the order howe health may be preserved, the other setting foorth the meanes how sicknes may be remedied. Of these two partes (in mine opinion) that is more excellent which preserveth health and preventeth sicknes.

The best doctors of the time appreciated their duty to the public. True followers of Hippocrates, they had high ethical standards and deplored the activities of quacks and charlatans. There were many pleas for licensing requirements and for stricter laws. In 1518, on the advice of Thomas Linacre, the College of Physicians was founded, to control medical practice in London. It is significant that from this year also date some of the most important public health measures, initiated by the Privy Council, as the isolation and marking of infected houses, the isolation of goods from infected houses, the first London plague orders, and the first mention of bills of mortality.

This very important factor in controlling disease, the publication of bills of mortality, listing the numbers dead in each parish of the city, and the diseases of which they died, was inaugurated in England, and an example of one of these very rare documents will be exhibited.

The plague orders were expanded into a book for the use of the entire country, about 1588. In this, Elizabeth enunciated the policy of the participation of the state in matters of health.

This was consistent with her general attitude, that the welfare of all the people was the concern of the state, and that the state existed for the people. Thus, it could interfere with individual liberty, if the good of all the people were at stake. There were the usual protests that such rules infringed on personal rights. Some people insisted, on religious grounds, that the plague was not infectious, and that one should not attempt to avoid it, as this showed a lack of faith in God. This attitude often interfered with certain sections of the "Orders" concerning assemblies of people in time of plague. The idea that the plague was caused by the wrath of God frightened the people in the more serious epidemics, and there was a section in the "Orders" forbidding ecclesiastical or lay persons "to utter such dangerous opinions upon the payne of imprisonment." A number of preachers were thrown into jail for continuing to spread such doctrines.

In these "Orders" and in similar works, the procedure for dealing with an epidemic was outlined. Important factors in this were the isolation of the infected, rules against assemblies of people, closing of schools, cleaning of the streets, provision for food supply, burial of the dead, and the treatment of the sick. It had been suggested that the city hire physicians and surgeons to care for those with plague, and in the "Directions," set down by the College of Physicians in 1636, this scheme was adopted. These men were paid a stipend by the city "to apply themselves to the cure of the Infected." If they died in service their widows were given a pension for life.

The organization thus outlined undoubtedly did much to check the spread of the plague but, since the real cause of the disease and the means of transmission were not known, it was impossible to eradicate it. There were some devastating epidemics. In 1603 and in 1625 the death rate in each instance was over one-sixth of the total population. At these times the people became panic-striken and the system broke down. The rules could not be enforced, the dead were left unburied, and everyone looked out for himself as best he could. Many of the doctors gave up in despair and fled from the cities but some courageously stayed and cared for the afflicted. Those hired by the city were bound by oath to remain. This human factor is one of the most difficult elements in administering any general scheme, as we realize today.

But the method of public health supervision described in the manuscripts and rare printed tracts in the Huntington Library exhibition was fundamentally sound and is the basis of our modern system, which now, with increased scientific knowledge of disease, has almost freed the world from such epidemics.

RAILROAD TRAVEL TO PASADENA

THE attention of the membership is again called to the fact that no identification certificates or special credentials are necessary this year to secure reduced railroad rates to Pasadena. Summer excursion fares are effective from most points, or short-term special rates. Consult your local ticket agent concerning your transportation if you are not traveling on the A.P.H.A. Special Train. The Association will make all arrangements for the group on the Special.

See page 670 of the June *Journal* for 45-day, round trip summer tourist fares from various centers.

THE PASADENA ANNUAL MEETING

General Information

PREVIOUS issues of the *Journal* have carried information to which members may wish to refer if they are making plans now to attend the Pasadena sessions. The following may be helpful:

June, pages 668 and 669. Pasadena hotels, with rates. Reservation blank

June, page 670. Forty-five day round trip, summer tourist rates from principal points.

July, pages 778 to 806. Scientific program, Health Education Institute program, meetings of other organizations, places of general and scientific interest in Pasadena and in California.

A.P.H.A. Special Train and All-Expense Tour

ALMOST representative group of Association members, their families, and their friends have reserved accommodations or signified their intention of doing so on the Special Train to Pasadena which the Association is sponsoring. The all-expense, conducted tour includes an evening in Chicago at the World's Fair, attendance at the Indian Ceremonials at Gallup, N. M., a day at the Grand Canyon, a day and an evening in San Francisco, a day in Stockton, Lodi and Sacramento, several hours in Salt Lake City and Denver, with entertainment and sightseeing at each stop. Detailed information about the tour was sent to the membership in June and will be repeated on request.

If you ride the A.P.H.A. Special, you will find in the delegation many of your old friends, and you will make many new ones. If you cannot make the complete tour, join it for such portion of it as you find convenient.

You must let us know in advance, if we are to have the pleasure of your company for all or for any part of the journey. We are sorry, but it will not be possible for you to join the Special Train en route unless arrangements with this office have been concluded before the departure of the train from New York on Tuesday, August 28.

Special Session on Poliomyelitis

SINCE the July *Journal*, containing the preliminary program, went to press, the Health Officers Section has arranged a symposium on poliomyelitis, announced here for the first time. The program follows:

SYMPOSIUM ON POLIOMYELITIS

Previous History of Poliomyelitis in California. J. D. Dunshee, M.D., and Ida May Stevens.

Administrative Problems. J. L. Pomeroy, M.D., and George H. Roth, M.D.

Clinical Features This Year. A. G. Bower, George M. Stevens, M.D., R. W. Meals, Mary Bigler, John Ewing, and Vernon Hauser.

Poliomyelitis in Northern California. Karl F. Meyer, M.D.

Pathology. Roy Van Wart, Cyril Courville, and E. M. Hall.

Experimental Investigations. Leslie Webster, James Trask, and John Paul.

Epidemiology. James P. Leake, M.D., Howard Chope, E. O. Cedar, W. Palmer Dearing, M.D., and A. G. Gilliam.

Serum in Prophylaxis and Treatment Including Hospital Outbreak. John F. Kessell, Ph.D.

Orthopedic Phases. James V. Luck.

Discussion opened by: George Parrish, M.D., and C. L. Lowman.

APPLICANTS FOR FELLOWSHIP

HEALTH OFFICERS

Cecil M. Burchfiel, M.D., San Jose, Calif.
Erval R. Coffey, M.D., Seattle, Wash.
Frank G. Crandall, M.D., Santa Monica, Calif.
Peter J. Cuneo, LL.B., M.D., Bakersfield, Calif.
Roy M. Fortier, M.D., Salinas, Calif.
Lunsford D. Fricks, M.D., D.P.H., Seattle, Wash.
Ralph Hendricks, M.D., Spokane, Wash.
Walter A. Leonard, M.D., Cambridge, N. Y.
Louis Olsen, A.B., Palo Alto, Calif.

LABORATORY

Marcos Fernan-Nunez, M.D., Milwaukee, Wis.
V. G. Isvekov, M.D., Rusk, Tex.
W. LeRoy Mallmann, Ph.D., East Lansing, Mich.
Austin U. Simpson, M.D., Seattle, Wash.

VITAL STATISTICS

Ethel R. Hawley, Montgomery, Ala.
Mary H. Lemon, Honolulu, Hawaii
Pierre-Paul-Henri Parrot, M.D., C.P.H., Bergerville, Que., Canada
John H. Watkins, Ph.D., New Haven, Conn.

PUBLIC HEALTH ENGINEERING

Rene Cyr, B.A., Montreal, Que., Canada
Louva G. Lenert, B.S. in C.E., Jacksonville, Fla.
Judson L. Robertson, Jr., B.S. in C.E., Washington, D. C.
Harvey G. Rogers, Minneapolis, Minn.
Francis J. Sette, Ph.B., S.M., Richmond, Va.
W. Waldo Towne, C.E., Pierre, S. Dak.
P. J. Alwin-Zeller, B.S., College Station, Tex.

INDUSTRIAL HYGIENE

J. Lewis Amster, M.D., New York, N. Y.
Elston L. Belknap, M.D., Milwaukee, Wis.
John J. Bloomfield, B.S. in C.E., Washington, D. C.
Dean K. Brundage, B.A., Washington, D. C.
Willard J. Denno, M.D., Dr.P.H., New York, N. Y.
Robert A. Kehoe, B.Sc., Cincinnati, O.
Michael Lake, M.D., New York, N. Y.
May R. Mayers, M.D., New York, N. Y.
William J. McConnell, M.D., New York, N. Y.
Eleanor Rantoul, New York, N. Y.
Austin D. Reiley, New York, N. Y.
Bradford C. Scudder, M.D., Cleveland, O.
William R. Tilton, M.D., Newark, N. J.
Lee J. Zoeller, Cincinnati, O.

FOOD AND NUTRITION

Arthur H. Bryan, V.M.D., M.A., Baltimore, Md.

CHILD HYGIENE

Charles L. Outland, M.D., Richmond, Va.

PUBLIC HEALTH EDUCATION

Neil S. Dungay, M.D., Ph.D., Northfield, Minn.
Marjorie L. Foster, B.S., Boston, Mass.
William J. French, M.D., Elliott City, Md.
Fern A. Goulding, R.N., Ames, Ia.
Benjamin C. Gruenberg, Ph.D., New York, N. Y.
Beatrice Hall, B.S., Hartford, Conn.
Alice M. Hill, A.B., New York, N. Y.
Alfred W. Jones, St. Louis, Mo.
Jean V. Latimer, A.M., Boston, Mass.
Helen I. D. McGillicuddy, M.D., Boston, Mass.
Robert W. Osborn, A.B., Buffalo, N. Y.
Aurelia B. Potts, M.S., R.N., Nashville, Tenn.
Albert R. Renwick, D.P.H., A.M., Charlevoix, Mich.
Kenneth D. Widdemer, New York, N. Y.
Virginia R. Wing, Cleveland, O.

PUBLIC HEALTH NURSING

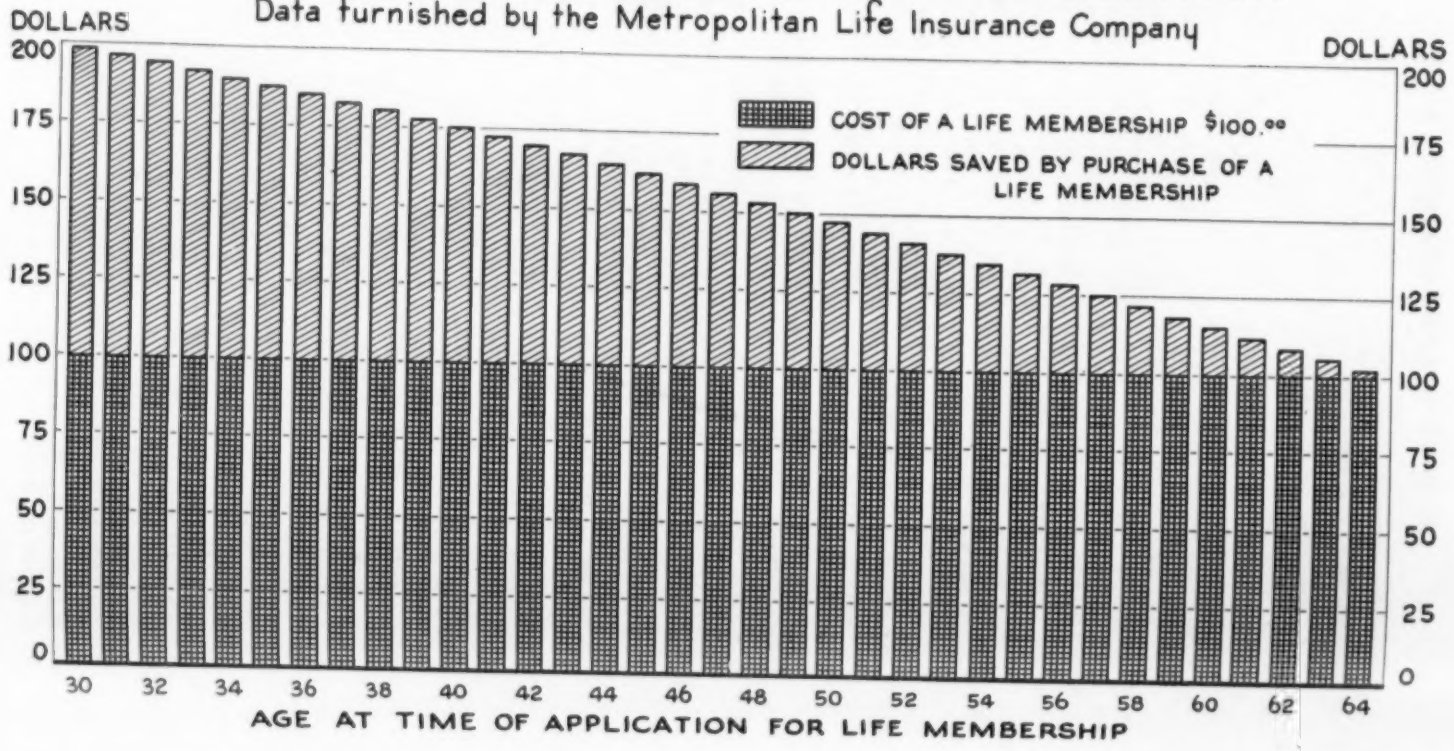
Mary A. Alexander, R.N., Topeka, Kans.
Alice C. Bagley, R.N., San Francisco, Calif.
Leah M. Blaisdell, B.S., Albany, N. Y.
Helen E. Bond, M.A., Savannah, Ga.
Gertrude H. Bowling, R.N., Washington, D. C.
Marion G. Crowe, R.N., Portland, Ore.
Phyllis M. Dacey, R.N., Kansas City, Mo.
Anne M. Doyle, R.N., Hamilton, O.
Laura A. Draper, B.S., New York, N. Y.
Nina E. Garrison, B.S., Nashville, Tenn.
Bertha C. Greenwell, R.N., Nashville, Tenn.
Elinor D. Gregg, Washington, D. C.
Julia L. Groscop, R.N., Garrett, Ind.
Frances F. Hagar, B.S., Murfreesboro, Tenn.
Edna L. Hamilton, R.N., Detroit, Mich.
Adah L. Hershey, R.N., Des Moines, Ia.
Ruth W. Hubbard, B.S., Philadelphia, Pa.
Erna Kowalke, R.N., Milwaukee, Wis.
Anna H. McCarthy, R.N., Fargo, N. D.
Bettie W. McDonold, Louisville, Ky.
Edna L. Moore, Toronto, Ont., Canada
Olga Oberhellmann, R.N., University City, Mo.
Mabel J. Rue, M.A., Grand Rapids, Mich.
Emilie G. Sargent, R.N., Detroit, Mich.
Kathryn K. Schulken, R.N., Denver, Colo.
Mary E. Stebbins, R.N., St. Louis, Mo.
Minnie A. Thomas, R.N., Oklahoma City, Okla.
Louise K. Tooker, Cincinnati, O.

DOLLARS SAVED BY THE PURCHASE OF A LIFE MEMBERSHIP

[In place of payment of annual dues]

IN THE AMERICAN PUBLIC HEALTH ASSOCIATION

Data furnished by the Metropolitan Life Insurance Company



APPLICANTS FOR FELLOWSHIP (cont.)

Ruth C. Waterbury, R.N., New York, N. Y.
Elsie Witchen, R.N., Pittsburgh, Pa.
Marion C. Woodbury, R.N., Great Barrington, Mass.
Juanita G. Woods, R.N., Richmond, Va.

EPIDEMIOLOGY

Samuel M. Creswell, M.D., Tacoma, Wash.
Anson B. Ingels, M.D., Globe, Ariz.
James P. Leake, M.D., Washington, D. C.
Edwin L. McQuade, M.D., Dr.P.H., University, Va.
Vivian A. Van Volkenburgh, M.D., Dr.P.H., Baltimore, Md.

UNAFFILIATED

Lela J. Beebe, M.D., Santa Maria, Calif.
Helene T. Bennett, A.M., Yuma, Ariz.
W. Alfred Buice, M.D., Dr.P.H., Pullman, Wash.
Helen L. Burke, Denver, Colo.
Hazel Corbin, New York, N. Y.
Ernest C. Dickson, M.B., M.D., San Francisco, Calif.
Raphael B. Durfee, M.D., Bisbee, Ariz.

A WORD TO THE THRIFTY

VERY few of us, at any time, will entirely disregard an opportunity to reap a financial benefit from thrifty buying or from careful and calculated investments. Why, then, do A.P.H.A. Fellows continue to overlook the gain inherent in Life Membership? They should do so no longer.

A careful study of the chart on the opposite page will reveal the savings which will accrue to Fellows by taking Life Membership at various ages. For example, a Fellow applying for Life Membership at the age of 40 will save a little over $75. This saving (three-quarters of the cost of Life Membership) is of such proportion as to warrant careful investigation.

Beside the straight economical benefits, others accrue to Life Members: (1) annual payment of bills is onerous to some—Life Membership eliminates that; (2) in times of low income, a Life Member is assured of his continuation in the Association, thereby safeguarding for all time his professional standing; (3) a Life Member can pride himself on the high type of professional spirit he has shown by investing in the future of public health work.

Life Membership dues need not be paid at once—the payments may be spread over a year from the date of election, which takes place at each Annual Meeting.

Some may ask—What is done with the dues of Life Members? They are set up in a Life Membership Fund entirely separate from other Association funds, and only the interest therefrom is used to carry the cost of each Life Member's participation in Association activities.

It must be obvious that the advantages of Life Membership far outweigh the disadvantages. The Committee on Fellowship and Membership, therefore, urges each and every Fellow to give serious thought to the desirability of applying for Life Membership.

AGE AT TIME OF APPLICATION FOR LIFE MEMBERSHIP

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers

Edmundo Avina, M.D., Avenida Alcalde No. 134, Guadalajara, Jal., Mex. Chief of Coördinated Services (Federal and State)

Edward J. Farrell, M.D., 3206 Oak Park Ave., Berwyn, Ill., Health Director, City Health Dept.

H. F. Hutchinson, M.D., Pearl St., Forestville, N. Y., Health Officer

Robert D. Hyde, M.D., 9615 Brighton Way, Beverly Hills, Calif., Acting Health Officer, District of Los Angeles County

W. Lassiter, M.D., Gainesville, Fla., City Health Officer

Charles Nelson Leach, M.D., C.P.H., Volksgesundheitsamt, Hanuschgasse 3, Vienne I, Austria, Field Director, International Health Division, Rockefeller Foundation (Assoc.)

Gustavo A. Rovirosa, M.D., Unidad Sanitaria Cooperativa, Orizaba, Vera Cruz, Mex., Director of Coöperative Health Unit of Orizaba

Laboratory

George Dexter Brigham, Ph.D., State Board of Health, Montgomery, Ala., Charge of Laboratory

Clara Winifred Burnham, A.B., 2451 Hearst Ave., Berkeley, Calif. (Assoc.)

Julia M. Coffey, A.B., 373 State St., Albany, N. Y., Assistant Bacteriologist, Division of Laboratories and Research, State Department of Health

Roy Edward Coupal, P. O. Box 606, Eureka, Calif., City Bacteriologist

Jesse H. Inman, M.D., Kern General Hospital, Bakersfield, Calif., Director, Public Health Laboratory

Carl E. Wallace, B.S., 718 Medical Arts Bldg., Tacoma, Washington, City Bacteriologist

Public Health Education

Anne Simpson Aller, M.A., 2508 Benvenue Ave., Berkeley, Calif. (Assoc.)

Lu Crandall, A.B., 150½ Agard St., Auburn, Calif., Supervisor of Health, Placer County Schools

Avis C. Eaton, M.D., 135 Stockton, San Francisco, Calif., Venereal Disease Clinics

Russell Wilbur Force, D.D.S., 600 First Trust Bldg., Pasadena, Calif., Chairman, Clinic Committee, Pasadena Dental Association

Honoria Hughes, 6115 Arcade Bldg., Seattle Wash., Executive Secretary of the Anti-Tuberculosis League of King County

Elizabeth McFadden, A.B., 340 South 16th St., San Jose, Calif., Head, Health & Hygiene Dept., San Jose State Teachers College

Henrietta Morris, Sc.D., 117 N. W. Trinity Place, Portland, Ore., Health Education Director, Oregon Tuberculosis Association

Joseph Shilen, M.D., Leech Farm, Pittsburgh, Pa., Supt., Tuberculosis Sanitarium

David B. Treat, A.B., 909 Berkeley Road, Phoenix, Ariz., Coördinator, Health Service, Phoenix Union High School

Beatrice H. Woodward, R.N., 582 Market St., Room 802, San Francisco, Calif., Field Director, California Tuberculosis Association

Vital Statistics

Francis C. Driscoll, A.B., Quincy Health Department, Quincy, Mass., Statistician

Public Health Engineering

Claude H. Ballard, Blountville, Tenn., Sanitary Inspector

Francis Wilson Kittrell, M.S., State Dept. of Public Health, Nashville, Tenn., Associate Sanitary Engineer

Child Hygiene

Florence B. Jordan, State Board of Health, Helena, Mont., Assistant Director, Child Welfare Division

Public Health Nursing

Edith B. Aldridge, R.N., Room 203, District Bldg., Washington, D. C., Supervisory Nurse, Child Hygiene Service, Health Department

Myrtle C. Applegate, 554 S. Third St., Louisville, Ky., Supervisor, Public Health Nursing Assn.

Helen Aydelott, R.N., 1230 Villa Place, Nashville, Tenn., Staff Nurse

Alice Frances Boyer, Bureau of Child Hygiene, Room 304, State Department of Health, Trenton, N. J., Supervisor of Nurses

Mary Brain, 275 Hubbard Ave., Salt Lake City, Utah, Metropolitan Nursing Service

Agnes Brown, R.N., 1847 S. 6th East, Salt

Lake City, Utah, Nurse, Metropolitan Life Ins. Co.

Florence B. Bussell, R.N., 1025 2nd Ave., Oakland, Calif., Supervisor of Nurses

Rose K. Butler, R.N., 328 Maple St., Holyoke, Mass., Executive Director, Holyoke Visiting Nurse Association

Loneta M. Campbell, 3001 Woodburn Ave., Cincinnati, O., Director, Visiting Nurse Association

Frances E. Curtis, 122 North H St., Madera, Calif., County Health Nurse

Margaret Douglas, R.N., Monteagle, Tenn., County Nurse, Grundy County

Winifred L. Fitzpatrick, R.N., 100 North Main St., Providence, R. I., Director, District Nursing Association

Alma E. Hartz, 403 City Hall, Cedar Rapids, Iowa, Director of Nursing

Martha I. Hauk, A.B., Hackley School Bldg., Muskegon, Mich., Supervising School Nurse

Bertha B. Holmes, Community House, Purchase, N. Y., Public Health and Community Nurse

Margery Keeler, 28 Strawberry Hill Ave., Stamford, Conn., On Board of Stamford Visiting Nurse Association

Linnie M. Laird, 2315 N.E. 43d Ave., Portland, Ore., School Nurse

Pauline Marshall, R.N., 303 E. St., Salt Lake City, Utah, Metropolitan Nurse

Martha McEntire, 67 Fontenelle Apts., Ogden, Utah, Metropolitan Life Insurance Co., Nurse

Ada Cecelia McGrath, R.N., 174 N. Walnut St., East Orange, N. J., Supervisor of School Nurses

Burtice A. Rees, 65 Court St., Buffalo, N. Y., State Supervisory Nurse

Valeria Rittenhouse, R.N., University of Wyoming, Laramie, Wyo., University Nurse

Cornelia Roys, R.N., 402 West Main St., Lebanon, Tenn., Public Health Nurse, Wilson County

Hilda Marie Schneider, Community Hospital, San Mateo County, San Mateo, Calif., Supervising Nurse

Mary B. Scott, M.A., 14 Bank St., Fall River, Mass., Supt., District Nursing Association

Josephine L. Shefner, R.N., Haskell Institute Hospital, Lawrence, Kansas, U. S. Indian Service

Mary Elizabeth Stearns, R.N., 194 Concord St., Manchester, N. H., Supervisor of District Nursing Association

Elizabeth S. Taylor, R.N., Bureau of Public Health Nursing, State Department of Health, Hartford, Conn., Director

Justine L. B. Thorp, R.N., 318 W. Cedar St., Compton, Calif., School Nurse, Public Health Nurse

Cornelia van Kooy, R.N., State Board of Health, Capitol, Madison, Wis., Director, Bureau of Public Health Nursing

Dorothy A. Whitelock, 1040 Salem St., Chico, Calif., City Public Health Nurse

Epidemiology

A. M. Menzies, M.D., D.P.H., Provincial Board of Health, Victoria, B. C., Canada, Epidemiologist

Richard M. Taylor, M.D., Institut Bouisson-Bertrand, Rue Ecole de Medecine, Montpellier (Herault) France, Field Director, International Health Division, Rockefeller Foundation (Assoc.)

Unaffiliated

William Andre Elfer, St. Rose, La., Member St. Charles Parish Board of Health

George U. Wood, Peralta Hospital, 434 30th St., Oakland, Calif., Superintendent

NEWS FROM THE FIELD

U.S.P.H.S. ENGINEERS TRANSFERRED

INFORMATION has been received that Sanitary Engineer Arthur P. Miller, F.A.P.H.A., of the U. S. Public Health Service, has been transferred from Norfolk, Va., to New York, to take charge of that Service of Sanitary District No. 1. He is located in the Sub-Treasury Building, New York.

At the same time Sanitary Engineer L. M. Fisher, F.A.P.H.A., was transferred to Washington, D. C., to assume charge of Sanitary District No. 2, which was moved back to Washington, D. C., from Norfolk, Va.

LEAGUE OF MENTAL HYGIENE IN BRAZIL

THE National League of Mental Hygiene of Brazil, according to its recent report, has been giving most of its attention in the 10 years of its existence to a campaign against alcoholism, to physical examinations of persons intending to marry, particularly men, and to child guidance work. The child guidance clinic established by the league is working with mentally retarded or otherwise mentally abnormal children in some of the public schools of Rio de Janeiro. Each child is given a thorough physical and psychological examination, and a written report of his condition with the necessary advice is presented to the parents. The results of this work are highly praised in Brazil.—*Archivos Brasileiros de Hygiene Mental,* Rio de Janeiro, 1933, vol. 6, No. 4.

TUBERCULOSIS CONFERENCE IN POLAND

THE Ninth Conference of the International Union Against Tuberculosis will be held in Warsaw, Poland, September 4–6. A special party is being arranged to go from the United States, with a trip to Russia for those who can leave in advance. For information, write to the National Tuberculosis Assn., 50 West 50th Street, New York.

GERMAN HEALTH AND SAFETY MEASURES

THE rooms in which home work is done must be free from danger to the life, health, or morals of the workers. The Federal Minister of Labor may order for certain branches of industry or certain kinds of establishments measures for the protection of the workers' health, and also of public health; may entirely prohibit any home work that is combined with considerable danger to life, property, morals, or public health.

As under the old law, the employment of children of school age may be forbidden by the Minister of Labor, or the age limit may be raised.—*Reichsgesetzblatt,* Berlin, 1934, part I, p. 214; text of the home work law of 1923.

ITALIAN LAW REGULATING EMPLOYMENT OF WOMEN AND CHILDREN

EXTENT of Application of the Law—The Italian law of April 26, 1934, regulating the employment of women under 21 and of children under 15, supersedes the law of 1907 and its amendments. The new law is much more extensive in its application than the old; it applies to workers in a large number of occupations, including commercial ones, and to clerical as well as manual workers, whereas the old law applied only to manual workers in certain industries. The new law does not apply to domestic servants, home work-

ers, agricultural workers, maritime workers, employees of the National Government, of the provinces, nor of the communes.

BELGIUM—LAW REGULATING HOME WORK

INDUSTRIAL home work is regulated in Belgium, apparently for the first time, by a law passed February 10, 1934, which provides for the establishment of a national commission on industrial home work—the wages paid and the hygienic conditions under which such work is done. The commission is to include 3 employers and 3 workers, as well as a chairman not belonging to either class, who must be well versed in economic and social subjects. All the members are to be appointed by the King for 6 years. To aid in deciding on wages the commission may add temporarily to its membership 2 employers and 2 workers.

The commission is to have authority to make investigations with regard to wages and working conditions of home workers. At the request of workers or employers, it is to intercede in wage disputes and to recommend a minimum wage rate if the representatives of the workers and the employers fail to agree or if the wage rate that they agree upon is in its opinion too low. Payment of the wages recommended by the commission may be made compulsory by royal decree.

TYPHOID VACCINATION IN ILLINOIS

THE Illinois State Health Department has instituted a vaccination campaign against typhoid in 11 counties in southern Illinois. The work is being carried out in Jefferson and Fayette Counties and was scheduled to begin early in June in Saline, Williamson, Jackson, Union, Randolph and Madison Counties. It will be extended into remaining counties as soon as facilities permit.

NEW HEALTH UNIT IN MICHIGAN

THE establishment of the Van Buren County Health Department has been made possible by the W. K. Kellogg Foundation. Operation on a full-time basis was planned for July 1. The Foundation will supply most of the funds, it is stated, the state the usual annual subsidy of $3,000 and the county office space and equipment.

HYGIENE AND SAFETY IN WORKSHOPS IN ITALY

THE workshops must be kept clean and well ventilated and must satisfy certain requirements of hygiene and safety; rules against overcrowding are prescribed. The factory-inspection office may forbid women and children to remain in the workshops during the rest periods.

Women under 21 and children under 15 may not be employed without obtaining an "employment book," in which is written a certificate of fitness, issued by a physician in the public service. In certain kinds of work, to be specified in a later decree, the employer will be required to provide physical examinations for women under 21 and children under 15 at regular intervals in order to ascertain whether they are able to continue the work; in certain dangerous, difficult, or unhealthful occupations such examinations may be prescribed for women of all ages and boys under 18.

In addition to providing for an increase in the number of workers subject to physical examinations, the law also provides for an increase in the number of examining physicians; besides the district health officers who made the examinations under the old law, physicians employed by public social welfare agencies, especially the National Bureau for Maternity and Infancy, will also be called upon to make such examinations.

Penalties are provided for violations

of the law, which will become effective at a date to be announced later.—*Gazzetta Ufficiale del Regno d'Italia*, Rome, No. 99 (Straordinario), 1934; translator's comment.

BIOGRAPHY OF DR. WELCH

THE trustees of Johns Hopkins University and its medical faculty have selected Dr. Simon Flexner, director of the Rockefeller Institute for Medical Research, to write the biography of the late Dr. William H. Welch.

ARIZONA PUBLIC HEALTH MEETING

THE Seventh Annual Meeting of the Arizona Public Health Association was held at Prescott, Ariz., June 5–6. A number of important papers were presented.

INTERNATIONAL LEAGUE AGAINST CANCER

AN International League for the Combat of Cancer was founded in Paris, March 24, 1934, at a meeting attended by representatives of 32 nations, it is reported. It is planned to have a permanent office in Paris and to publish a yearly report. The League also plans to organize an international convention in Rome, probably for 1936, to seek international coöperation in the field of statistics and in the campaign against quackery and in exchange of literature.

ANNUAL SCIENCE EXHIBITION

UNDER the auspices of the American Association for the Advancement of Science and Associated Societies, of Washington, D. C., there will be held an Annual Science Exhibition at Pittsburgh, Pa., December 27–30, 1934.

Special attractions announced are: exhibits and demonstrations in zoölogy, cosmic rays, deuterium, neutrons, induced radioactivity, stratosphere exhibition, and talking films in the physical sciences from the University of Chicago, etc.

MEETING OF MILITARY SURGEONS

THE annual meeting of the Association of Military Surgeons of the United States will be held at the Medical Field Service School, Carlisle Barracks, Pa., October 8, 9, and 10, 1934. No papers will be read as the entire program is one of demonstrations in the field operation of the Medical Department. The members attending will live at the post and the expense will be very slight.

PERSONALS

PAUL J. ZENTAY, M.D., F.A.P.H.A., of St. Louis, was recently elected president of the Missouri Social Hygiene Association, succeeding Dr. Llewellyn Sale.

DR. FRANK A. TINKER, Health Officer of Lapeer, Mich., was given a banquet by the Lapeer County Medical Association recently in honor of his completion of 50 years in the practice of medicine. For the last 10 years he has been city health officer.

GRACE ABBOTT, member A.P.H.A., for 13 years Chief of the Children's Bureau, Washington, D. C., resigned her office recently, effective July 1. Miss Abbott will go to the University of Chicago to become Professor of Public Welfare Administration.

WILTON L. HALVERSON, M.D., member A.P.H.A., of Los Angeles, Calif., has been appointed Health Officer of Pasadena, Calif., succeeding Dr. Jay D. Dunshee, member A.P.H.A., who is now Health Director of the California State Department of Public Health.

GEORGE J. WHERRETT, M.D., member A.P.H.A., of Ottawa, Ont., Canada, has been appointed executive secre-

tary of the Canadian Tuberculosis Association. He succeeds Dr. Robert E. Wodehouse, member A.P.H.A., who was recently appointed Deputy Minister of Health in the Department of Pensions and National Health at Ottawa.

DR. W. W. PETER has been appointed Director of Medicine and Health of the Navajo Indian Reservation, under the U. S. Bureau of Indian Affairs. His address is Gallup, N. M.

DR. IRVING S. CUTTER, Dean of the Medical School, Northwestern University, Chicago, was appointed health editor of the *Chicago Tribune*. He succeeds Dr. William A. Evans, F.A.P.H.A., Tribune health editor since 1911, who is retiring.

MARGARET SANGSTER, young Navajo trained nurse, is the first full-blood American Indian public health nurse to go out to work among her people, under assignment of the Indian Bureau, to one of the Navajo community centers being developed under the new Indian policy instituted by the present administration. She recently finished her year of public health study at the Henry Street Settlement. Miss Sangster was born on the Navajo Reservation, was educated in an Indian Boarding school, and was then graduated in nursing from the Methodist Hospital in Los Angeles. For 3 years, following her graduation, she served as a nurse in the Indian Service at the Carson School Hospital in Stewart, Nev.

LEONARD GREENBURG, M.D., Fellow A.P.H.A., of the Yale University School of Medicine, New Haven, Conn., has been granted six months' leave of absence to take an appointment as acting Health Officer of the City of New Haven, in place of Dr. John L. Rice, now Health Commissioner of New York City. A permanent appointment is impossible at present on account of a city ordinance requiring a year's residence for all appointees to municipal positions. Since there are no qualified candidates in New Haven who are able to take the position on a permanent basis, it is hoped that the ordinance may be modified before the end of the year.

CONFERENCES

Aug. 6–10, Annual Meeting of the American Dental Association, St. Paul, Minn.

Aug. 13–18, Twelfth International Veterinary Congress, New York, N. Y.

Aug. 15–24, Educational Exposition and Conference, under the auspices of the National Association of Public School Business Officials, New York, N. Y.

Aug. 31–Sept. 3, Third Institute on Health Education, under the auspices of the American Public Health Association, in connection with its 63rd Annual Meeting, Pasadena, Calif.

Sept. 2, State Laboratory Directors' Conference, for Directors of State Laboratories and their principal assistants only, University Club, Pasadena, Calif.

Sept. 3–6, 63rd Annual Meeting, American Public Health Association, Pasadena, Calif.; headquarters, Huntington Hotel and Maryland Hotel.

Sept. 4–6, 9th Conference of the International Union Against Tuberculosis, Warsaw, Poland.

Sept. 10–13, 13th annual scientific and clinical session of the American Congress of Physical Therapy, Philadelphia, Pa.

Oct. 8–10, Annual Meeting of the Association of Military Surgeons of the United States, Medical Field Service School, Carlisle Barracks, Pa.

Oct. 15–18, 17th Annual Meeting of the American Dietetic Association, Washington, D. C.

Oct. 15–19, American College of Surgeons, Boston, Mass.

Nov. 13–16, Southern Medical Association, San Antonio, Tex.

Dec. 27–30, Annual Science Exhibition of the American Association for the Advancement of Science and Associated Societies, Pittsburgh, Pa.

April 29–May 3, 1935, 19th Annual Clinical Session of the American College of Physicians, Philadelphia, Pa.

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SEPTEMBER 3–6, 1934

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American Social Hygiene Association

Association of Women in Public Health

California Association of Dairy and Milk Inspectors

California Dairy Council

California Dairy Industries Association

Health Officers Section, California League of Municipalities

California Sewage Works Association

Conference of State Laboratory Directors

Delta Omega

Harvard University Alumni

Johns Hopkins University Alumni

Massachusetts Institute of Technology Alumni

Western Branch, American Public Health Association